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THESIS

A COMPARATIVE ANALYSIS OF STRATEGIC APPROACHES FOR INFORMATION TECHNOLOGY (IT) MANAGEMENT FOR COMMANDER NAVAL SURFACE FORCES

by

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13. ABSTRACT (maximum 200 words)

As the lead organization for all United States Naval Surface Forces, Commander Naval Surface Forces (CNSF) is committed to providing operational commanders with well-trained, highly effective, and technologically relevant surface forces. Aligning itself with the Department of the Navy's Information Management (IM) and Information Technology (IT) strategic mission objectives, CNSF is dedicated to delivering secure, interoperable, and integrated IM/IT capabilities to the Marine and Sailor in support of war-fighting missions. CNSF utilizes several IT systems and applications to enhance information collection, sharing, and storage including the Surface Forces (SURFOR) Web, Training and Operational Readiness Informational Services (TORIS), and Continuous Monitoring Program (CMP). In lieu of the Navy's attempt to cut operational budget costs and become more financially responsible, CNSF is discussing options to increase its efficiency in IT contract management. CNSF—one organization with two Type Commander (TYCOM) staffs and support organizations—must institute a strategic approach for the management of IT to maximize efficiency throughout the organization. This thesis will focus on identifying strategic approaches to IT management, from both governmental and nongovernmental perspectives, that will best facilitate the acquisition and management of systems and applications to help achieve the goals and objectives of CNSF.

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A COMPARATIVE ANALYSIS OF STRATEGIC APPROACHES FOR INFORMATION TECHNOLOGY (IT) MANAGEMENT FOR COMMANDER NAVAL SURFACE FORCES

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ABSTRACT

As the lead organization for all United States Naval Surface Forces, Commander Naval Surface Forces (CNSF) is committed to providing operational commanders with well-trained, highly effective, and technologically relevant surface forces. Aligning itself with the Department of the Navy's Information Management (IM) and Information Technology (IT) strategic mission objectives, CNSF is dedicated to delivering secure, interoperable, and integrated IM/IT capabilities to the Marine and Sailor in support of war-fighting missions. CNSF utilizes several IT systems and applications to enhance information collection, sharing, and storage including the Surface Forces (SURFOR) Web, Training and Operational Readiness Informational Services (TORIS), and Continuous Monitoring Program (CMP). In lieu of the Navy's attempt to cut operational budget costs and become more financially responsible, CNSF is discussing options to increase its efficiency in IT contract management. CNSF—one organization with two Type Commander (TYCOM) staffs and support organizations—must institute a strategic approach for the management of IT to maximize efficiency throughout the organization. This thesis will focus on identifying strategic approaches to IT management, from both governmental and nongovernmental perspectives, that will best facilitate the acquisition and management of systems and applications to help achieve the goals and objectives of CNSF.

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LIST OF SYMBOLS, ACRONYMS, AND ABBREVIATIONS

2M	Miniature/micro miniature
AAW	Anti Air Warfare
ASUW	Anti Subsurface Warfare
ASW	Anti Surface Warfare
ATG	Afloat Training Group
CCA	Clinger Cohen Act
CEO	Chief Executive Officer
CINCLANTFLT	Commander in Chief, U.S. Atlantic Fleet
CINCPACFLT	Commander in Chief, U.S. Pacific Fleet
CIO	Chief Information Officer
CLASSRON	Class Squadron
CMP	Continuous Monitoring Program
CNSF	Commander, Naval Surface Forces
CNSL	Commander, Naval Surface Force Atlantic
CNSP	Commander, Naval Surface Force Pacific
COMFLTFORCOM or CFFC	Commander, Fleet Forces Command
COMUSFLTFORCOM, or CUSFF	Commander, U.S. Fleet Forces Command
COO	Chief Operating Officer
CPF	Commander, Pacific Fleet
CRO	Current Readiness Officer
DISA	Defense Information Systems Agency
DoD	Department of Defense
DoN	Department of the Navy
DoN CIO	Department of the Navy Chief Information Officer
EA	Enterprise Architecture
FY	Fiscal Year
FDA	Food and Drug Administration
GPRA	Government Performance and Results Act of 1993

IM	Information Management
ISIC	Immediate Superior in Command
IT (Enlisted Navy Rating)	Information Systems Technician
IT	Information Technology
LCM	Life cycle management
MIT	Massachusetts Institute of Technology
NIPRNet	Nonsecure Internet Protocol Router Network
NGEN	Next Generation Enterprise Network
NMCI	Navy Marine Corp Intranet
NPS	Naval Postgraduate School
OMB	Office of Management and Budget
ROI	Return on investment
ROIT	Return on information technology
SIPRNet	Secure Internet Protocol Router Network
SME	Subject matter expert
SURFOR	Surface Forces
SWDG.	Surface Warfare Development Group
SWE	Surface Warfare Enterprise
TORIS	Training and Operational Readiness Information Services
TYCOM	Type Commander
U.S.	United States of America
U.K.	United Kingdom

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James: I would like to first thank God, for giving me the strength to stay focused and on task to be able to complete this degree program. I would like to thank all the members of my family. First I would like to thank my wonderful parents Allen and Dorothy, for giving me positive guidance and always encouraging me to seek academic excellence. I want to thank my siblings Jamal and Escencee. I would like to thank my lovely wife, Karen, for her support, patience, and understanding. Thanks to my two sons, Damontae and Jalen, for being such great children. Also, thank you to my best friend, Daryl, for keeping me sane, listening to me, and encouraging me to focus on the light at the end of the tunnel. I would also like to thank the professors at NPS, for helping me to broaden my horizons so that I can think outside of the box. Last but not least, to all the wonderful military officers that I've met and have helped me through this whole ordeal, I am eternally grateful.

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I. INTRODUCTION

A. NAVY INFORMATION TECHNOLOGY (IT) STRATEGIC DIRECTION

The recognition that information is a critical enabler for ensuring mission success, particularly in the complex, asymmetric, and highly dynamic war-fighting environment of today, has been a driving force in shaping the IT strategic plans of the Department of Defense (DoD). In the last decade, the DoD's leadership has focused its attention on implementing a strategy to transition from the existing information environment represented by stove-piped systems and silos of information, to that of a network-centric environment. As stated in the National Defense Strategy, March 2005, "Transforming to a network centric force requires fundamental changes in processes, policy, and culture" (NDS, 2005, p. 18). To provide a common understanding, and better articulate this vision of net-centric transformation, the DoD Chief Information Officer (CIO)—in collaboration with the CIOs of the Military Departments (MILDEPs), Defense Information Systems Agency (DISA), National Security Agency, United States Strategic Command, and Joint Chiefs of Staff—developed the DoD Information Management (IM)/IT Strategic Plan. This plan attempts to provide the direction and design for IT and supporting capabilities, as outlined in the National Defense Strategy. It identifies actions deemed critical for transforming DoD operations from platform/organization-centric to net-centric. It also provides a common understanding of the near- and mid-term actions required to meet the goals and objectives across the Defense Information Enterprise.

As the lead organization for all United States Naval Surface Forces, the Commander Naval Surface Forces (CNSF) is committed to providing operational commanders with well-trained, highly effective, and technologically relevant surface forces (SURFOR) to include ships, combatant craft, and Sailors that are certified across the full spectrum of warfare areas. To sustain peak levels of combat readiness, CNSF equips its forces with the necessary training, tools, maintenance, and material to successfully accomplish their mission.

In today's information environment, the ability to provide the aforementioned components for mission success has been made easier through the use of Information

Systems and IT. Aligning itself with the Department of the Navy's (DoN) IM and IT strategic mission objectives, CNSF is dedicated to "delivering secure, interoperable and integrated IM/IT capabilities to Marines and Sailors to support the full spectrum of warfighting and warfighting-support missions" (U.S. DoN CIO, 2008, p. 7). CNSF has implemented several IT systems and applications to enhance information collection, sharing, and storage, including the SURFOR Web, Surface Warfare Enterprise Data Warehouse (SWE-DW), Training and Operational Readiness Informational Services (TORIS), and Continuous Monitoring Program (CMP).

The Navy is currently researching ways to cut operational budget costs and become more financially responsible, while maintaining unwavering competency in its core mission areas. Likewise, CNSF is discussing options to increase its efficiency, particularly in the area of IT contract management. Due to the current organizational structure of CNSF—one organization with two TYCOM staffs and support organizations—a strategic approach for the management of IT must be instituted to maximize efficiency throughout the organization. This thesis will focus on identifying strategic approaches to IT management that will best facilitate the acquisition and management of systems and applications to help achieve the goals and objectives of CNSF.

B. RESEARCH QUESTIONS

The following research questions were formulated and analyzed to assist ongoing efforts to develop and implement an effective IT strategy for CNSF. If not properly studied and prepared, an IT strategic plan runs the real risk of ending up on someone's shelf or filed away in a cabinet, useful primarily for satisfying legal mandates and passing funding compliance hurdles (Garcia, 2008).

1. Primary Question

- What are the strategic IT goals for CNSF, and which strategic approach for managing IT will best support the vision, mission, and strategic objectives of CNSF?

2. Secondary Questions

- What are the strategic IT approaches available to CNSF's business level executives, in order to better utilize and manage IT assets?
- What changes should be made to the CNSF organization to better align available resources with IT, in order to accomplish its strategic
  IT goals?

C. POTENTIAL BENEFITS

Due to budget constraints, the DoD, and all organizations under its purview, are examining ways to become more responsible about IT funding. Although IT is not a core competency for CNSF, creating an IT strategy that eliminates unnecessary redundancies, reduces ineffective business processes, and enhances the IT infrastructure will better support the ability of CNSF to potentially free up more funds that can be allocated to strengthen other programs. Ultimately, IT investment decisions will be linked to CNSF's strategic objectives and mission, thus ensuring effective allocation of resources across the organization.

This thesis will encompass an enterprise-level evaluation of the current IT strategy of CNSF and an assessment of applicable strategic approaches to IT management that will enhance organizational efficiency. Upon the completion of the research, a recommendation based on facts will be presented to CNSF; however, systems acquisition and implementation will be discussed only in the context of future work.

D. METHODOLOGY

The qualitative research methodology of this thesis entailed the collection, identification, examination, and analysis of relevant DoD, DoN, and business strategy documents pertaining to requirements, standards, and best practices for planning,

generating, and successfully implementing enterprise-level, strategic IT management plans. From these strategic documents, IT strategic approaches were identified and discussed. Additionally, there was an examination of CNSF's organizational structure and current IT strategy. Discussions via email, teleconference, and in person were utilized to gather information from financial managers and IT subject matter experts (SME) within the CNSF organization to gain detailed information concerning CNSF, its business processes, and current/future expectations about IT management. Collectively, stakeholders were able to identify areas of needed improvement. Conclusions were drawn, and recommendations offered, to assist CNSF executive-level managers and practitioners in the development of an IT strategy based on researched best practices and publish literature governing DoD and non-DoD enterprise-level, strategic IT management. Finally, this methodology allowed for future work to be conducted, particularly in the areas of cost-benefit analysis, return on investment, and the development of a follow-on acquisition strategy for IT systems, applications, and infrastructure for CNSF.

E. ORGANIZATION OF STUDY

1. Chapter II: Overview of IT Strategy

Chapter II will include the necessary academic review of existing material on various strategic approaches for IT management as applicable to both private businesses and DoD. The research will focus on how IT can be used to enable CNSF to execute and achieve its mission objectives. The literature review will concentrate in the areas of improving IT infrastructure, governance, and streamlining of IT processes to better align IT with the strategic objectives of CNSF.

2. Chapter III: Outline of CNSF Staff and IT Organizational Structure

This phase focuses on describing "who" CNSF is as an organization—discussing history, mission, and responsibilities. Chapter III outlines the organizational structure of CNSF and describes their duties as the Surface Type Commander and Surface Warfare Enterprise Commander. Through operational-level interviews within the N6 Department (CNSF IT lead), we will extend the organizational analysis to include IT infrastructure

and business process requirements, thus identifying the core strategic IT goals and objectives of CNSF. The data collected from the assessment and interviews will assist in outlining the current requirements, business processes, IT infrastructure, and organizational design of CNSF.

3. Chapters IV and V: Findings, Recommendations, and Future Work

Once strategic approaches to IT have been evaluated and the CNSF organization has been analyzed, recommendations can be made for more efficient methods to manage CNSF IT resources. Chapter IV describes the areas of improvement that were determined, based our research, and then explains recommendations based on studies of successful methods of approach for strategic IT management in both business and governmental arenas. Finally, Chapter V provides a summary of research and conclusions, and discusses proposed future work.

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II. OVERVIEW OF STRATEGIC INFORMATION TECHNOLOGY MANAGEMENT

A. STRATEGIC PLANNING FOR INFORMATION TECHNOLOGY

1. Definition of Strategic Planning

Strategic planning is the process that an organization identifies the priorities that are essential to an organization's mission and can evolve to respond to dynamic environments (Allison, 2005). The purpose of strategic planning is to provide direction, unity of effort, consistency of purpose, and flexibility as an organization continually strives to improve its competitive position (Boar, 1993). It enables future objectives to be identified in response to perceived opportunities and threats and, by understanding organizational strengths and weaknesses, activities are selected and resources allocated to meet those specific objectives.

The strategic planning process must provide a clear, detailed, and ordered set of steps designed to culminate in the development and execution of the organization's strategic plan (Boar, 1993). The process is strategic because it necessitates the preparation of alternative ways to respond to the circumstances of the organization's environment, whether or not its circumstances are known in advance. Strategic planning involves setting goals and developing an approach to achieving those goals. The planning process should raise a sequence of questions that help planners examine experience, test assumptions, gather and incorporate information about the present, and anticipate the environment in which the organization will be working in the future (National Alliance for Media Arts and Culture (NAMAC), 2009).

2. Strategic Planning Process

There are numerous perspectives, models, and approaches used in strategic planning. Development of a strategic plan is dependent upon the nature of the organization's leadership, culture, operational environment, size, and expertise of those involved in the planning process. Some organizations scope their strategic plans out only one year, many to three years, and those with tremendous foresight go five to ten years

into the future. The most successful plans include not only top-level information, but incorporate plans of action as well. The development of the strategic plan helps to clarify the organization's priorities and ensure that key stakeholders are on the same page. Therefore, the strategic plan documents are far less important than the planning process itself. By providing direction, focus, consistency, and flexibility, strategic planning achieves the following (Boar, 1993):

- Provides a clear statement of direction.
- Provides the context for all business decisions.
- Enables autonomous, but coordinated, actions throughout the business.
- Creates a competitive agenda.
- Assures the long-term viability of the business.

The process is enabled by using various models, frameworks, and analytical approaches that help frame and focus the decision-making process. Although it appears linear in structure, in practice it is actually iterative (best described as a forward spiral) and is one of continuous improvement (Boar, 1993).

The strategic planning process is depicted in Figure 1 and covers three major areas:

- Assessment – Analysis of current and future business environment.
- Strategy – Provides purposeful direction to meet objectives.
- Execution – Implementation and monitoring of the approved strategy.

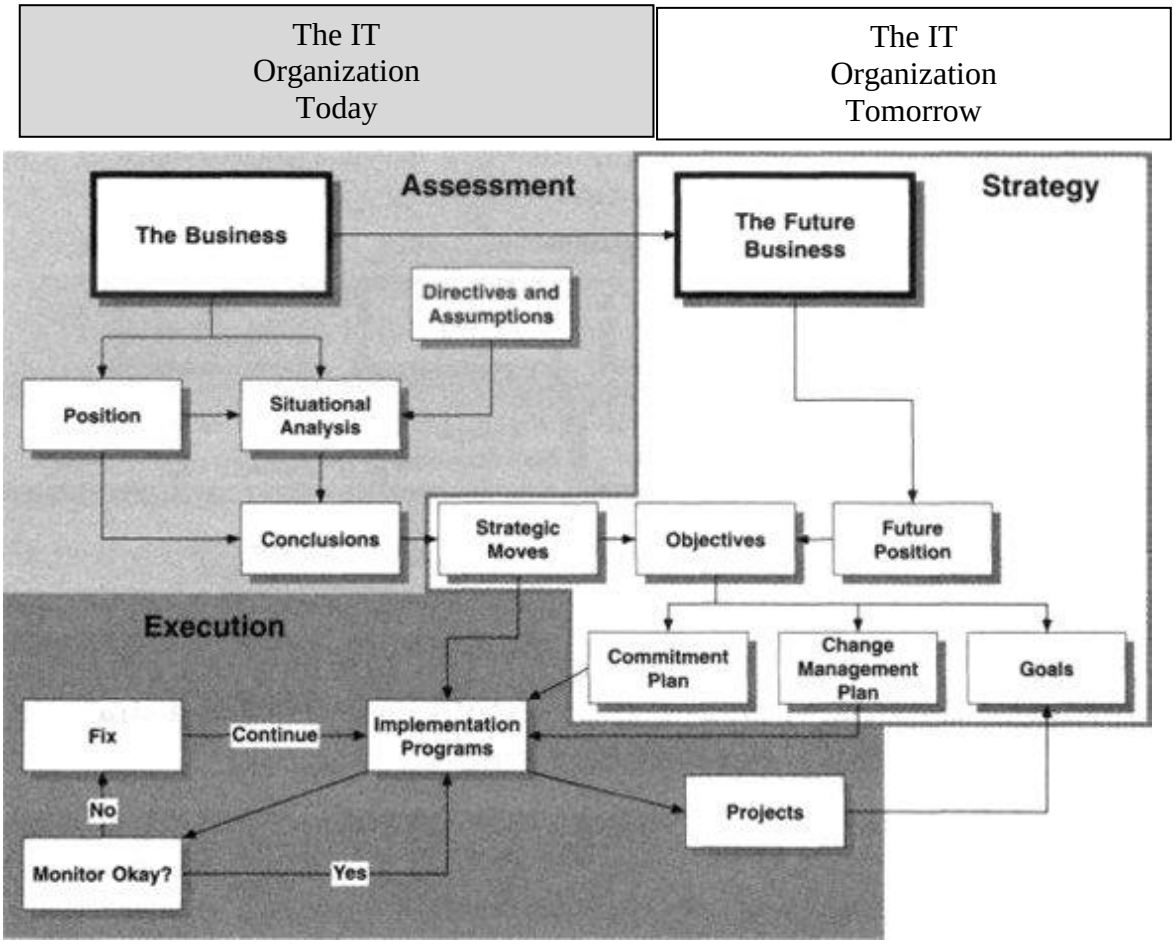

Figure 1. The IT strategic planning model (From: Boar, 2001)

a. Assessment

Having a strategic plan to bring an organization's vision into fruition is no longer an option, but is an absolute necessity. In order to develop an effective strategy, the first step is to obtain a definitive understanding of core processes and assess the value of those processes to the organization. There may be confusion when it comes to the word "assessment." Assessment is frequently mistaken for evaluation. The two concepts can go hand in hand, but are different. Assessment is the process of developing a clear and thorough understanding of the business situation from an internal and external perspective. It culminates in the identification of conclusions that pinpoint key organizational issues that require attention at the strategic level (Boar, 1993). Assessment is both a data-intensive and analysis-intensive activity. Evaluation differs

from assessment in that it measures the strengths and weaknesses of programs, policies, and personnel within an organization to improve its effectiveness.

As illustrated in Figure 1, the IT strategic planning model the assessment phase of the strategic planning model consists of business scope and alignment, directives and assumptions, positions, situational analysis, and conclusions. One of the most important parts of performing an assessment is realizing the business scope and alignment. The business scope provides an unambiguous shared agenda for the organization (Boar, 2001). Traditional businesses are set up in a hierarchical structure that has units organized interdependently to achieve the goals of the business. In order to fully understand the nature of the business, the assessment must examine the vision, mission, values, customer/markets, product/services, geography, strategic intent, driving force, and sustainable competitive advantage all—of which are key attributes of a business. After carefully assessing the business scope, the assessor should have a clear and concise view of the environment.

A business can reach its goals if the units work together to accomplish similar objectives. To achieve success, a business must understand three key factors of alignment (Boar, 2001):

- The business scope is internally aligned between its elements.
- All internal business units are aligned with each other.
- The aligned internal business functions are aligned with the needs of the external battlespace.

Coordination, perseverance, and concentration of effort toward a shared set of objectives are the core elements of alignment.

Results from the assessment provide managers and key stakeholders with the information needed to plan near- and long-term changes, and facilitate prudent decision making for IT investments that will allow the organization to function more efficiently. Specifically, in terms of an IT strategy, the assessment phase combines applications and infrastructure evaluations that measure operational efficiency, productivity, revenue drivers, and growth opportunities. Such evaluations focus upon (Perot Systems, 1996–2009):

- Applications architecture.
- Applications technical and functional capabilities.
- Infrastructure technical and functional capabilities.
- Data architecture.
- Hardware components.
- Network, applications, and databases.

b. Strategy

There is often a great deal of ambiguity and confusion in terminology surrounding the notions of strategy and strategic planning. Probably the most confusing is the word "strategy." Sometimes, strategy is used to mean specific actions to be taken. Other times, strategy is used to mean all the objects that compose the strategic plan (i.e., future business scope, future strategic positions, objectives, and commitment plan) (Boar, 1993). According to Johnson and Scholes (2006), strategy is the direction and scope of an organization over the long term. It is about first understanding where you are as an organization, where you are trying to go, and what resources are needed to not only get you to that desired end state, but to allow you to maintain a competitive advantage.

Referring back to Boar's IT strategic planning model, the strategy phase is comprised of strategy statements, objectives and goals, strategic moves, a commitment plan, and a change management plan. To form an effective strategy, an organization must formulate objectives and goals, while being committed to the possible changes that may occur. Strategy is often only considered to be a plan that will lead an organization to the future, but it must also consider trends and patterns from the past. Strategy as a plan is a guide or course of action into the future, a path to get from here to there. Strategy as a pattern is a consistency in behavior over time (Chew & Gottschalk, 2009). Typically, strategy exists at three distinct levels: corporate, business, and operational. Organizations today must realize the importance of aligning their overall strategy with IT in order to gain and maintain a competitive advantage. The mission, vision, objectives,

market strategy, knowledge strategy, and a general approach to the use of information, information systems, and IT must be incorporated to maximize the effectiveness of the strategic plan.

Corporate strategy, often referred to as enterprise strategy, is concerned with the overall purpose and scope of the business to meet stakeholder expectations. This strategy is often stated in an organization's mission statement. Business strategy is more concerned with how a business competes in a particular market. Strategic business decisions are centered on product choice, customer needs, and gaining a competitive advantage. For nonprofit organizations, competitive advantage comes in the form of longevity, sustainability, and efficiency.

Lastly, operational strategy governs how each component of the organization is organized. It is organized to execute the aforementioned business and corporate strategies. It is done by focusing on resources, people, and processes. At all levels, strategy is the collective output of the strategic planning process, and it is purposeful in that it creates a direct path of causation to the goals and objectives to the organization (Chew & Gottschalk, 2009). To establish and maintain distinctive strategic positioning, an organization needs to follow six fundamental principles (Potter, 2001):

- A strategy must start with the **right goal**; superior long-term return on investment. Only by grounding strategy in sustained profitability will real economic value be generated.

- A company's strategy must enable it to deliver a **value proposition**, or set of benefits, different from those that competitors offer.

- Strategy needs to be reflected in a **distinctive value configuration.** To establish a sustainable competitive advantage, a company must perform activities that differ from rivals or perform similar activities in different ways.

- Robust strategies involve **trade-offs**. A company must abandon or forego some product features, services, or activities in order to be unique at others.

- Strategy defines how all the elements of what a company does **fit** together. A strategy involves making choices throughout the value configuration that are independent; all of a company's activities must be mutually reinforcing.

- Strategy involves **continuity** of direction. A company must define a distinctive value proposition that it will stand for, even if that means foregoing certain opportunities.

The principles listed above pertain to private, public, profit, and nonprofit organizations. Strategy without action provides no value to an organization and, therefore, a firm detailed plan of action must be executed.

c. Execution

Execution is strategy in motion—the directed mobilization of resources toward a defined end (Boar, 2001). As soon as management assesses the nature of the business and develops a strategy, the focus then shifts to executing that strategy and producing acceptable results. The execution phase of Boar's IT strategic planning model includes preparing programs to implement change, dividing those programs into manageable projects, and monitoring the progress of these projects. The strategy that was created will not deliver the anticipated results if the organization does not execute it as planned. The ability to execute a strategy can be very difficult for management because it presents the daunting task of leading an organization into an atmosphere of change. Just because senior managers announce a new strategy does not mean that organizational members will agree with it or enthusiastically move forward in implementing it (Strickland, 2005).

Implementing and executing a strategy is sometimes considered the most difficult stage of the strategic planning process because they both involve determining what specific techniques, actions, and behaviors are needed to complete a successful change within the organization. When coming up with a plan for executing a strategy, a good place to begin is reviewing the assessment. The assessment should show the organization that their business can be done in a different way in order to achieve positive results. Key factors to execute a successful strategy include (Boar, 2001):

- A thoughtful commitment plan.
- A fully developed change management plan.
- The selection of able strategy owners and champions.
- The design of a human resource architecture that stimulates desired behaviors.
- Wide strategy development participation.
- Project management training and support.
- A professional strategic planning process that earns the organization's respect.
- A strategic intent worthy of extended individual effort, excitement, and commitment.
- A "deep and far-reaching strategy" that captures the imagination of the staff.
- The design of an internal IT economy that motivates desired behaviors and decision making.
- A well-designed customer satisfaction measurement system.

Now that an organization has implemented its plan and begun the execution phase of the strategic planning process, management must monitor the progress to decide how hard and how fast to push the process along (Strickland, 2005). Monitoring the progress of a project is a vital portion of management's role to the organization. Management must be able to identify issues that may be problematic early on so that they do not cause the project to become a failure. By monitoring, purposeful actions can be taken to meaningfully redirect the course of an organization's strategy to be in accord with evolving times and circumstances (Boar, 2001).

B. INFORMATION TECHNOLOGY STRATEGY

1. Definition

Within most markets, from manufacturing to research and development, and private sector profit organizations to public nonprofit organizations, the idea that IT is of

strategic importance, in addition to its operational benefits, is rarely met with disagreement. In fact, the use of information as a competitive weapon has been an underlying principle in the mission statements and visionary goals of most major companies since the mid-90s. Today, more and more, IT and IT-enabled processes are proving to be essential to business success. IT is no longer just a set of technologies delegated to a technical Chief Information Officer (CIO) it is a strategic asset to be managed by all business executives.

The core purpose in developing an IT strategy is to ensure that there is a strong and clear relationship between IT investment decisions and the organization's overall strategies, goals, and objectives (Glaser, 2006). IT strategy can be defined as a long-term plan for an organization's IT sector in which IT will be utilized to support the accomplishment of the organization's goals and mission objectives. An effective IT strategy should be brief, complete, and clearly connected to business success. A business unit IT strategy must also balance the imperative to drive business unit success with the need to integrate with enterprise-wide IT strategy. To facilitate strategic integration of IT into their overall business strategy, successful organizations have made the strategic role of IT an explicit part of their mission statement.

2. Levels of Information Technology Strategy

The IT strategy that an organization follows can be classed by how the organization treats IT and what they expect from it (Rapp, 2002). The attributes that define the strategy levels are the extent to which IT has been integrated into the overall business strategy, the use of IT to create purposeful benefits and competitive advantage, and the mixture of customized and packaged IT used to enhance business processes that provide value to the organization.

At the basic, or first level, are organizations that have linked together several IT packages to provide quasi-integrated IT support for most or all corporate functions. This basic approach includes outsourcing to IT integrators that provide IT support and also outsourcing enterprise management systems (EMS) that provide totally integrated IT systems (Rapp, 2002).

Level 2 organizations see IT as vital to their corporate strategies and competitive success and use IT as an important competitive tool to help them own the future of their industry's evolution (Rapp, 2002). These organizations often merge IT into business strategies, routine operations, and core processes that are already successful, thus extending and enhancing their value. It is essential that these organizations have a good understanding of their own culture and core processes in order to properly select, develop, and use the IT required for each business function.

Level 3 organizations take the strategy established at Level 2 to a higher level due to the extensive IT literacy and fluency shared throughout the top ranks of management. This means all senior executives, not just the CIO or Chief Executive Officer (CEO) are willing to discuss IT in terms of what IT means, what the choices are, and what must be done to put the organization on the leading edge (Rapp, 2002). These organizations use totally integrated management systems that link every section of an organization's supply, production, distribution, and service chains through the utilization of information technology.

3. Misconceptions of IT Strategy

The development of a sound IT strategy can be very important in that if an organization defines the IT agenda incorrectly or partially correctly, it runs the risk that significant organizational resources will be misdirected including the improper allocation of already scarce funds. This risk has nothing to do with how well an organization executes the chosen IT direction. Being on time, on budget, and on specification is of less importance if the wrong thing is being done. In the course of developing an IT strategy, an organization may fall victim to three major misconceptions about IT strategy. Those misconceptions, as identified by author and CIO John P. Glaser, are (Glaser, 2006):

- The IT strategy should be solely derived from a thorough review of organizational strategies and plans.
- The IT strategy should be dominated by a focus on defining needed application systems.

- The IT strategy is better if it is developed by using a rigorous methodology.

a. Deriving an IT Strategy

The IT strategy often originates directly from the organizational strategy; however, in doing so, strategists are limiting themselves by their failure to understand that an IT strategy should be based upon continuous improvement of core processes and information management, examining the role of new information technologies, and derived by assessing strategic trajectories (Glaser, 2006).

Every organization has a small number of core operational processes and information management tasks that are essential for the effective and efficient functioning of the organization. These core processes and information management needs can be assessed plans developed to improve performance of these processes through the use of information technology. As a result, the IT strategy is partly driven by a relentless year-in, year-out focus on improving core operational processes and addressing critical information management needs.

Examining the role of new information technologies is vital to IT strategy development because it gives the organization leverage to consider new approaches and capabilities that are enabled by IT. Understanding and articulating the benefits of these new technologies, and gaining organization-wide interest, can make IT investment decisions and strategy development a lot easier.

Deriving an IT strategy based upon an assessment of strategic trajectories involves thinking about where the organization sees itself in the mid to long term and what processes and activities it will be involved in. The trajectory discussion may be grounded upon IT applications or grounded upon on today's organization, with an effort being made to envision the organization as it would like to be in the future. That vision of an organization may point to IT strategy directions and needs. Discussions about strategic trajectory, and how to leverage the advantages of IT, can lead to initiatives that may be undertaken a few years out that will aid in a better understanding of the future and identify required steps to prepare the organization's information systems for it (Glaser, 2006).

The misconception that IT strategy should be based solely upon a derivation of needs from the organization's strategy can lead to bad decision making in regard to IT investments and should not be the only approach used. Organizations must include efforts to improve core organizational processes and information needs, the opportunities created by new technologies, and a discussion of strategic trajectories.

b. What Is the Focus of the IT Strategy?

According to Glaser (2006), most IT strategies focus efforts on the development of an application agenda and conclude with a discussion of the inventory of systems that are needed to improve the overall organizational strategy; however, it is essential that IT leaders also take into consideration application sourcing techniques (i.e., build versus buy), decide upon on the appropriate level of application uniformity throughout the organization, and also determine what processes and steps should be utilized for applications acquisition.

One of the most common misconceptions surrounding IT strategy development is that the main focus should be on defining needed application systems. Although applications systems are very important in providing the end users with the IT needed to increase organizational effectiveness and maximize efficiency of effort, there are many other aspects of a well-developed IT strategic plan that must be considered including:

- Infrastructure concerns.
- Data management.
- IT staff and governance issues.

In addition to applications, the IT strategy discussion must also focus upon on the addition or enhancement of broad infrastructure capabilities and characteristics. IT infrastructure is composed of the organization's IT components, such as operating systems and networks, and the architecture that provides the framework to ensure the achievement desired objectives. Decisions in regard to the level of support that is needed to ensure infrastructure reliability, agility, supportability, and interoperability must be made and reflected in the organization's IT strategy.

IT strategists must also decide how to handle the "data," which may be the single most important element of an information system. In general, decisions surrounding data focus on data standardization requirements, acquisition of new types of data, determining the organizational function responsible for data quality, integrating existing sets of data, and identifying technologies used to manage, analyze, and report data.

Another area of concern that a well-developed IT strategy must focus upon on is IT staffing and governance. IT staffs are typically comprised of analysts, programmers, Web designers, and computer operators that manage the daily operations of the various information systems for an organization. Organizations may decide that they need to explore outsourcing the IT function in an effort to improve IT performance or obtain difficult-to-find skills. In general, IT staff decisions focus on acquiring new skills, organizing the IT staff, and sourcing the IT staff either in-house or externally. IT governance is composed of the processes, reporting relationships, roles, and committees that an organization develops to make decisions and manage the execution of those decisions, regarding IT resources and activities. These decisions include setting priorities, determining budgets, defining project management approaches, and addressing IT problems (Glaser, 2006).

The heart of any IT strategy is an inventory of applications that need to be acquired and implemented. Applications are where the IT rubber meets the organizational road. However, the IT strategy needs to go well beyond the definition of applications. Application sourcing approaches, infrastructure characteristics, data standardization, governance, and the way an organization views IT are all essential elements of the IT strategy (Glaser, 2006).

c. Choosing a Methodology for IT Strategy

Utilization of a prescribed methodology can be very advantageous in developing an IT strategy. Approaches using a standardized methodology can make the process more precise, inclusive, and more likely to produce a set of desired outcomes. However, a study conducted on organizations in the United Kingdom (U.K.) U.K., which have a history of IT excellence, found that they had evolved to a state where their

business-IT alignment processes did not follow any particular methodology. The IT planning processes of almost all of these organizations shared similar characteristics (Glaser, 2006).

According to the study explained by M.J. Earl (1993), IT planning was not viewed as a separate process. IT planning, and the strategic discussion of IT, occurred together as a central part of organizational strategic planning processes and management discussions. IT planning was an incorporated component of the normal management conversation. It was understood throughout the organization that IT planning is a continuous process reflecting the continuous change in the environment, and in organizational plans and strategies. IT planning involved shared decision making and shared learning between the IT staff and the organization at large. IT leadership informed organizational leadership of the potential contribution of new technologies and constraints of current technologies, and organizational leadership ensured that IT leadership understood the business plans, strategies, and constraints that were vital to the success of the organization.

The results of the study imply that there is no single method for developing IT strategy; instead, the strategic development is a never-ending series of discussions and debates that include mutual learning and support. The limitations of IT strategy methods center on senior executive concerns with the connection of the IT agenda to the organization's strategy. This linkage is difficult for many reasons—business strategies often are very vague or too are volatile; IT opportunities are poorly understood outside of IT leadership; or the organization is unable to resolve the different priorities of different parts of the organization. These sources of organizational friction always will challenge the development of IT strategy, and there is unlikely to be any approach or methodology that can eliminate them (Glaser, 2006).

C. IT STRATEGIC APPROACHES

There are different approaches to integrating IT into the core processes of an organization. As previously mentioned, the strategic planning process concludes in the execution of the prescribed strategy; however, the execution and implementation phase must be in accordance with a predetermined framework or IT architecture. The majority

of successful organizations have come to the realization that there is indeed a valuable return on investment for IT (ROIT) and have focused their efforts on leveraging the power of IT in their daily operations. Unfortunately, some organizations, including the Department of Defense (DoD), have had a hard time applying a universal IT solution to improve its core processes, and billions of dollars have been spent on disparate, stove-piped systems with little or no room for growth or integration, and that add no value to the organization. The utilization of advancements in information technology and construction of agile, modular computing infrastructure is essential, but in itself does not meet this challenge. How does DoD, or any other organization, develop an IT strategy that will enable its members to perform core processes efficiently and effectively, while achieving positive results? Since each organization is different, one size does not fit all, so any approaches used should take care to (Horgan, 1998):

- Provide reliability, robustness, and ubiquity.
- Initiate training in both general-purpose and discipline-specific software.
- Start with strategy rather than technology.
- Think small: templates, pilot projects, and incremental implementation.

We will focus on three IT strategic approaches in an effort to discuss the integration of IT and business goals at the enterprise or corporate level.

1. Enterprise Architecture (EA)

EA is a method and an organizing principle that aligns functional business objectives and strategies with an IT strategy and execution plan (Oracle, n.d.). EA provides a top-level model of how information flows through the organization within the enterprise domain. It identifies the key nodes, potential constraints, and the relationships between these nodes. It is a cornerstone to integrating or updating technologies and understanding what data is needed where and when (Catania, Hamilton, & Melear, 2000). Simply stated, enterprise architectures are blueprints for systematically and completely defining the baseline of an organization or desired environment. EAs are essential for evolving information systems and developing new systems that optimize their mission value.

As with many methods, enterprise architectures can be used to demonstrate different ideas and concepts depending on who is using them, and how they are used. On one side, they can be used to describe business processes, information flows, and activities. In this sense, EA provides the underlying framework, which defines and describes the platform required by the enterprise to attain its objectives and achieve its vision. In this way, EAs can be used to capture a common perspective of the entire enterprise to show how an organization domain should function. The objects of the architecture may be activities, grouped together into roles or functions, with required information flows representing the relationships between the objects. From another angle, EAs can be used to describe IT capabilities, their networks, and their functions. In this case, the architecture provides a networking diagram, which defines the capabilities that the enterprise has to achieve its objectives and vision. In this way, EAs can be used to capture existing capabilities and future needs in any networking domain. The objects of this architecture may be systems, their subcomponents, and the transactions that are required and/or supported between these components.

a. Benefits of an EA

EAs provide a framework for the modeling of business practices and allocating systems to that framework. The techniques are extremely flexible and can be designed to benefit a number of different communities, even within the same business domain. For instance, EA techniques can be used to capture war-fighting doctrine from the planning and requirements communities just as easily as it can be used to demonstrate system-to-system interactions. It is adaptable to software integration (the relationship between software components and modules) as it is to system interoperability. According Dr. Jeanne W. Ross and Dr. Peter Weill (2005), enterprise architecture provides the organizing logic for business processes and information technology. Enterprise architecture can also define an organization's desired levels of integration and standardization. Dr. Ross, a principal research scientist at the Massachusetts Institute of Technology (MIT) Center for Information Systems Research, and Dr. Weill, the Director of the MIT Center for Information Systems Research state that EA initiatives can involve dismantling legacy systems or redesigning business processes. The research that they

have conducted has led them to believe that the benefit of EA efforts can be elusive and that an effective EA typically leads to lower IT costs, more senior management satisfaction, and ultimately improved performance of the organization (Ross & Weill, 2005).

When combined with the use of an object-oriented, relational architecture database that can be easily updated, maintained, and reused, there are many benefits that can be realized over the current processes. First, repeated duplication of efforts and multiple data requests would be reduced. Instead of multiple architectural efforts that are geared toward a specific customer, by incorporating a data-centric, central repository approach, all architectural efforts eventually contribute to the corporate knowledge of the entire community. And, by embedding the data and the use of that data into the business processes of the organization, the demand for (static) products is reduced, if not eliminated (Catania, Hamilton, & Melear, 2000). Furthermore, EA planning considers both the strategic and tactical need for information exchange in supporting the organization's mission. Using a data-centric approach, time attributes would provide the necessary information to improve contingency and resource planning and allocations (Spewak, 1992).

b. Why Use EA?

Similar to an architectural blueprint, EA serves as a reference point during later implementation phases, when members of an organization refer back to it to verify important decisions, update the design, and generally determine what they need to do to accomplish the project. Also, like an architectural blueprint, the primary value that EA adds is not just as a reference point for project management. EA also helps to prototype solutions during the design stage by identifying how the enterprise is designed today, where the opportunities are for the project to innovate that design, how things will have to change take advantage of that innovation, and what the final design of the enterprise will look like once the project is implemented. EA, when done correctly, provides a systematic assessment and description of how the business function operates at the current time. It provides a "blueprint" of how it should operate in the future, and it provides a road map for getting to the desired end state (Minoli, 2008). EAs should be

concerned about the direction an organization will take concerning its IT. Three questions that must be asked: (1) How does the money spent on IT compare to achieving the goals of an organization? (2) Does an operational process model exist at the organization? (3) Does the organization have a strong foundation for execution? Most often, the answer to those questions are not known because upper-level management is usually not knowledgeable about what it takes to guide the architecture in the direction that provides the best ROI for an organization. Most organizations use EA today to not only to survive, but to thrive in today's global market. Some of the companies use EA for the following reasons (Hoque, 2002):

- Improve standardization.
- Speed up development.
- Lower the cost of implementing systems.
- Improve quality.
- Generally govern IT in the enterprise.

c. Disadvantages of EA

Enterprise architecture is the organizing logic for business processes and IT infrastructure, reflecting the integration and standardization requirements of the firm's operating model (Ross, 2006). Even though EA presents an organization with a long term solution to integrate and standardize business processes, it unfortunately has disadvantages associated with it. In an interview conducted by NPS professor Frederick Hayes-Roth he states that:

> The predominant disadvantage of utilizing enterprise architecture as a strategy for IT management is the risk that EA efforts will run over in time (and money). When people try to implement SAP ERP for example, they often take much longer than they had anticipated and often ultimately fail. This can wreak serious harm on the enterprise, because it has not only spent resources, wasted time, and failed to implement what it wanted, but it has all the opportunity costs of things it might have done instead (esp. incremental improvements, or in particular improvement of a few key processes). In short, they fall behind rather than move forward. So it's worse than doing nothing. Avoiding this risk is of paramount importance. (Hayes-Roth, 2009)

Another disadvantage of EA occurs when the wrong person is put in the position of lead architect. A chief architect who is an unproductive leader can present a problem to any type of project. An organization using the EA approach may find it difficult to overcome a chief architect lacking in leadership skills, even if they are the resident expert on EA.

Receiving support from stakeholders can also prove to be difficult for an organization when using EA to standardize its business processes. The success of EA may hinge on how well stakeholders support and are involved with the architecture (Handler, 2008). Stakeholders are usually not knowledgeable when it comes to IT, so once organizations embark on EA projects their priorities tend to lie elsewhere.

It should be noted that the value of EA is very difficult to measure. Once the EA has been implemented, the value of EA is often indirect, so it may not be obvious to everyone in the organization (Pettey & Stevens, 2009). The value of an EA project can be confusing to those who work outside of the IT department and it can be very challenging to justify its worth to stakeholders.

d. U.S. Food and Drug Administration (FDA) Case Study

The FDA is responsible for protecting the public health by assuring the safety, efficacy, and security of human and veterinary drugs, biological products, medical devices, and the United States food supply (VM Ware, 2009). In 2002, the Prescription Drug User Fee Act (PDUFA) required the FDA to develop a plan for consolidation of its IT infrastructure across eight division centers and identify standard software applications to be utilized for common business needs. This presented the FDA with several challenges including (FDA Case Study, n.d.):

- The need to align IT with the agency business strategy.
- Limited funding and resources to support the effort.
- FDA's eight service centers and offices operated in a decentralized manner.
- Lack of standardized processes and systems to share and exchange information.

- Corporate culture resistant to change.
- High expectations of FDA units being serviced.

In order to comply with the government's mandates, the FDA looked at EA to serve as the method to accomplish its goal of efficiency and effectiveness. The FDA worked with each center and office to create standard guidelines, approved and distributed agency-wide. These guidelines were used to support the development of a consolidation blueprint for the FDA's IT infrastructure. The Office of the Chief Information Officer (OCIO) was reorganized and common governance and reporting structures were established, ensuring that the department strongly supported the FDA's mission, goals, and objectives (FDA Case Study, n.d). The Office of IT Shared Services was also created by the FDA to focus on its business core processes, influence technology and information, and manage costs more effectively.

With the implementation of the EA business process, IT would now be able to align and work better under the government's mandates. Not only could the FDA remove redundant resources and efforts, it could do a better job of tracking all IT investments throughout the organization, adjust costs to meet budget cuts, and increase staff skill levels, while enhancing the delivery of services. Implementing EA resulted in the FDA committing to a federated IT approach, which means that individual centers are standardized and expected to follow the same approach that has been set forth at the agency level. This approach allows the FDA to implement its EA across all centers, while providing the necessary detail related to center-specific processes and systems. Despite IT budget constraints, the IT consolidation has allowed FDA to use fewer resources, while operating more efficiently and providing better services to its customers.

The FDA continues to use EA as part of its strategic solution to standardize its business processes and consolidate its IT infrastructure. EA has helped IT align with the agency's business strategy and drives business decisions. The FDA IT consolidation solution, driven by the EA framework, is reducing costs, improving mission performance, and leading to a more engaged and qualified IT staff (FDA Case Study, n.d).

2. Enterprise Resource Planning (ERP)

In today's highly competitive environment organizations are actively seeking new ways to integrate, collaborate, and standardize business processes in a manner to maximize efficiency and ultimately cut costs. Enterprise Resource Planning (ERP) was originally introduced into the corporate world by research and analysis firm Gartner Inc. in 1990. ERP has emerged as one of the premier enterprise level IT integration tools and has been sought after and utilized by several Fortune 500 companies and government agencies. According to Liza Rosa's Master's Thesis and an article from *Washington Technology* ERP can be defined as:

> An industry term for the broad set of activities supported by multi-module application software that helps a manufacturer or other businesses manage the important parts of its business, including product planning, parts purchasing, maintaining inventories, interacting with suppliers, providing customer service, and tracking orders. ERP can also include application modules for the finance and human resources aspects of a business. Typically, an ERP system uses or is integrated with a relational database system. The deployment of an ERP system can involve considerable business process analysis, employee retraining, and new work procedures (*Washington Technology*, 1999 & Rosa, p. 4, 2002).

a. Benefits of ERP

The aim of ERP is to integrate all departments, functions, and processes across a company into a single computer system that can serve all those different departments' particular needs (Wailgum, 2008). ERP software includes functionalities such as finance and accounting, human resources, and often supply/warehousing in one application. ERP combines the optimized applications of each department into a single integrated application that runs off a single database. ERP systems consist of software applications that provide organizations with the capability to manage their core business processes. These systems differ from previous generations of software primarily because ERP relies on a common database for both financial and nonfinancial applications that are accessible on a real-time basis. Also, ERP software consists of a process view of the enterprise, which allows organizations to adopt best business practices and redesign existing processes as they implement new software-based modules (Rowen, 1999). The

real value of ERP to organizations lies in the term "enterprise." From a top management view, the idea of ERP is much greater than the technology to provide an efficient client-server environment and a common database, of which both support improved accuracy and availability of information. For management, ERP may provide a tool to unite the various functions within the organization into a whole effective organization striving to achieve a common goal with the same level of resources. By understanding the managerial ideas behind this philosophy of treating the organization as one system, the need for ERP becomes clear and provides the link between management and information systems technology (Ptak & Schragenheim, 1999).

b. Why Use ERP?

Organizations utilize ERP as an IT strategy for the following reasons:

- **Integrate financial information**–As the CEO tries to understand the company's overall performance, he may find many different versions of the truth. Finance has its own set of revenue numbers, sales has another version, and the different business units may each have their own version of how much they contributed to revenues. ERP creates a single version of the truth that cannot be questioned because everyone is using the same system.

- **Integrate customer order information**–ERP systems can become the place where the customer order lives from the time a customer service representative receives it, until the loading dock ships the merchandise and finance sends an invoice. By having this information in one software system, rather than scattered among many different systems that cannot communicate with one another, companies can keep track of orders more easily and coordinate manufacturing, inventory, and shipping among many different locations at the same time.

- **Standardize and speed up manufacturing processes**–Manufacturing companies—especially those with an appetite for mergers and acquisitions—often find that multiple business units across the company make the same widget using different methods and computer systems. ERP systems come with standard methods for automating some of the steps of a manufacturing process. Standardizing those processes and using a single, integrated computer system can save time, increase productivity, and reduce head count.

- **Reduce inventory–**ERP helps the manufacturing process flow more smoothly, and it improves visibility of the order fulfillment process inside the company. That can lead to reduced inventories of the stuff used to make products (work-in-progress inventory), and it can help users better plan deliveries to customers, reducing the finished goods inventory at the warehouses and shipping docks. To really improve the flow of your supply chain, you need supply chain software, but ERP helps too.

- **Standardize HR information**–HR may not have a unified, simple method for tracking employees' time and communicating with them about benefits and services—especially in companies with multiple business units. ERP can fix that.

Implementing ERP into an organization is a complex and costly project. The cost for implementing ERP can range from $500,000 to $130 million, and it can often produce gut-wrenching organizational change that can be long and arduous (Ross, 1999). Therefore, it is critical for an organization to ensure that the implementation of an ERP is successful, considering the investment. The implementation of ERP is made up of five stages beginning with design, then implementation, stabilization, continuous improvement, and concluding with transformation. Examples of firms that implemented ERP systems include: General Electric, Coca-Cola, Hershey Foods, International Business Machines Corporation (IBM), and BP/Amoco (Lousek, 2000).

c. Disadvantages of ERP

ERP systems have many advantages such as improved cycle time, business process automation, better reporting capabilities, etc.; however, as with all IT solutions, there are some associated disadvantages. Many of the problems organizations have with ERP systems are due to inadequate investment in ongoing training for involved personnel, particularly those responsible for implementing and testing changes. There is also a lack of corporate policy protecting the integrity of the data in the ERP systems and how it is to be used. In an attempt to cut costs, many organizations cut training budgets, which results in improper handling of the implemented ERP system. Small, privately-

owned enterprises are often undercapitalized, meaning their ERP system is often operated by personnel with inadequate education in ERP in general, or in the particular ERP vendor package being used (Nick Mutt, n.d.).

Perhaps one of the biggest disadvantages to this technology is the cost, particularly the large dollar investments for setup, implementation, and maintenance, even for small projects. At this time, only large corporations can truly take advantage of the benefits that are offered by this technology. This leaves most small- and medium-sized businesses in the dark. Several studies have shown that the biggest challenges companies will face when trying to implement ERP deals with investment. One of the problems with ERP is that it is hard to customize, and very few companies can effectively use ERP right out of the box. It must be modified to suit their needs, and this process can be both expensive and tedious. Even when a company does begin changing the system, they are limited in what they can do (Exforsys, Inc., n.d.). Dr. Tom Bramorski, in a case study conducted at the University of Wisconsin, identifies the following ERP disadvantages to be common among many organizations:

- Long and painful implementation and debugging processes.
- Organizational resistance to change.
- Strategic benefits are hard to quantify.
- Plans are too ambitious (time and money).
- Expectations are unrealistic.
- Lack of understanding of the strategic benefits of ERP implementation (follow-the-crowd mentality).
- Superficial implementation, with a lack of necessary infrastructure support.
- There are frequent compatibility problems with the various legacy systems of the partners.
- The system may be over-engineered relative to the actual needs of the customer.

There are several other disadvantages seen by the organizations who have implemented ERP systems, but typically they are outweighed by the advantages.

Strategists and analysts must look at all aspects of the organization to determine if the value added is worth the cost of implementing an ERP system.

d. Coca Cola Case Study

Coca-Cola Enterprises Inc. is the world's largest marketer, distributor, and producer of products manufactured by The Coca-Cola Company. In 2006, Coca-Cola Enterprises Inc. achieved total revenue of $19.8 billion, distributing 42 billion bottles and cans, or 19% of The Coca-Cola Company's volume worldwide (Lexmark, 2007). Prior to implementing an ERP, Coca-Cola was facing a tough challenge of trying to utilize IT to stay ahead of their competitors. Coca-Cola is including their bottling partners, which are independent companies, in their implementation, resulting in an extension of their enterprise. Its goal is to lower costs across the enterprise and allow itself and their bottling partners to share best practices, pool resources, and leverage their combined size to get better deals on IT systems and raw materials (Violino, 1999). Since the bottling companies are independent, Coca-Cola had to convince them to buy in to the ERP solution. Coca-Cola senior management believed that ERP would speed supply process management, forecasting, and production planning. With the implementation of ERP, Coca-Cola could now compare and determine whether they were meeting their goals by region and by store (Reyelts, 1999).

According to Edward L. Reyelts' 1999 Master's Thesis at the Naval Postgraduate School, Coca-Cola is an example of an organization that the Department of the Navy (DoN) can follow, while trying to integrate its networks and possibly implement the Navy's version of an ERP. In the same manner as Coca-Cola gained a competitive advantage with buy-in from its independent bottling companies (major stakeholders), the DoN could gain buy-in from those Navy commands selected to implement ERP in pilot programs (Reyelts, 1999). The Navy has an ERP program that is a big part of the Navy's business transformation and just as the DoD has oversight committees and goals, so does the Navy. In 2003, the ERP program office was developed to take the Navy pilot programs and integrate them so they could become one large ERP program for use Navy-wide. Some of the focus areas of ERP are: acquisition

program management, aviation supply chain/maintenance management, regional maintenance, and warfare center management (Louzek, 2000).

3. Outsourcing

Outsourcing is the use of resources that are external to a company in order to meet the needs of an organization. Outsourcing is a process in which activities that are required to accomplish the goal of an organization are no longer conducted within this organization. With regard to IT, outsourcing can include anything from outsourcing all management of IT to a company such as IBM or Electronic Data Systems (EDS), to a very small and easily defined service such as disaster recovery or data storage, and everything in between (Overby, n.d.). Outsourcing is not a new business concept. When preparing to outsource services, it is very important to generate a baseline of current services. Human resources, payroll, shipping, printing, and IT have been popular outsourcing targets. In its implementation, outsourcing is essentially a classic buy versus make decision (Overby, n.d.). Outsourcing is not without risk, especially when the organization is focused primarily on short-term cost avoidance. Most organizations, like the DoD, express their objectives mostly in terms of short-term cost-savings or manpower reductions. Therefore, the decision to outsource must be based not only upon short-term cost avoidance, but also on a strategic assessment of how outsourcing will provide a long-term, competitive advantage to an organization (Lonsdale, 1998). Figure 2 depicts the outsourcing model.

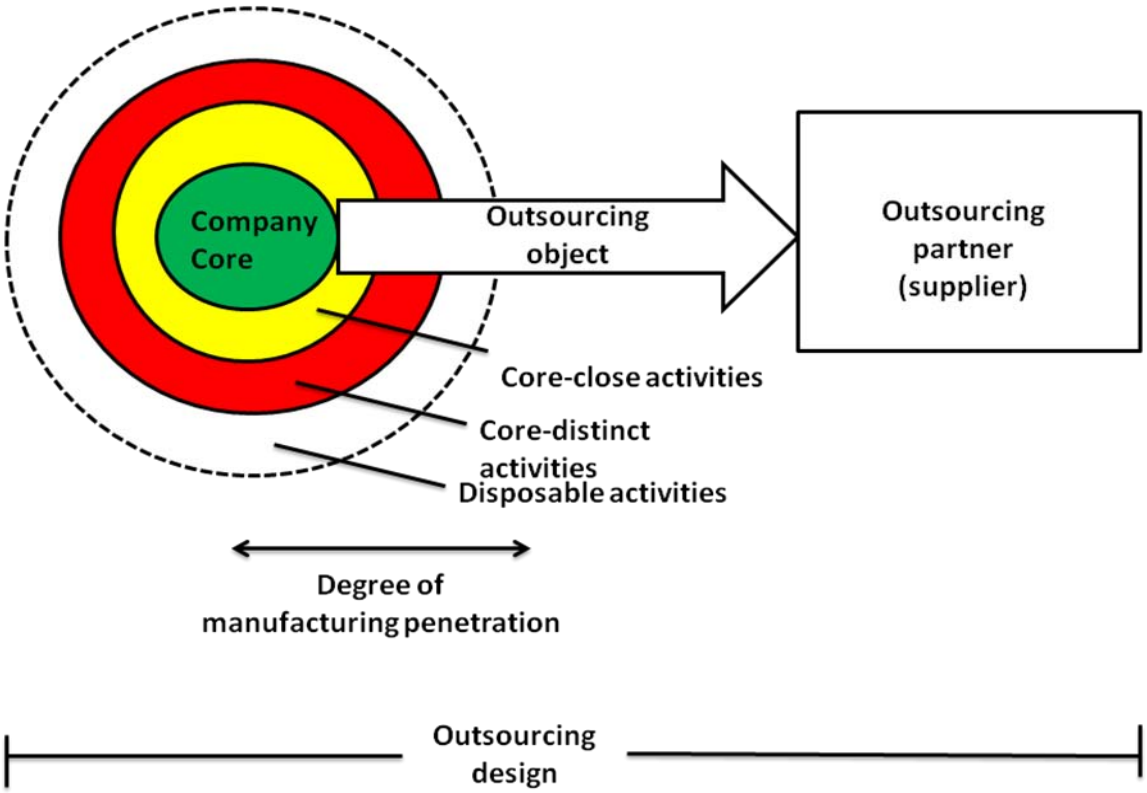

Figure 2. Outsourcing Model (From: Arnold, 2000)

a. Benefits of Outsourcing

There are a number of benefits to a government organization that outsources. First, by contracting out government-provided service to the private sector, the government is released from the day-to-day operations and is relegated to providing oversight. The government is subsequently able to devote greater effort toward long-term goals and other priorities (Mangravite & Moffitt, 1993). Next, the insertion of competition into an environment previously insulated from market influences inspires greater efficiency and improved quality in the performance of traditionally government-performed tasks (Nuskey, 1992). Lastly, the economic benefits of contracting with a private firm proficient in performing a service provided by the government can be significant, resulting in major cost savings. Additionally, the private firm may have greater incentive to provide high-quality service at lower cost than does a government agency because private firms offer competition where government agencies have a monopoly (Kettl, 1993).

b. Why Outsource Information Technology?

Organizations outsource a number of services for different reasons, but outsourcing IT can prove to be more arduous. Lacity and Willcocks (2001) have argued that IT is not just another resource like advertising, refuse collection, or even human resources, so outsourcing IT is more difficult. They go on to say that outsourcing IT must be managed differently because of the fast pace at which IT capabilities are evolving, so there is a great deal of uncertainty in terms of predicting the needs of IT beyond a 3-year horizon. They also argue that IT outsourcing involves large switching costs not found in other industries. The reason for outsourcing is different depending upon the organization, but reasons for outsourcing often include one or more of the following (Lonsdale & Cox, 1998):

- Focus resources on core activities.
- Cost reduction.
- Convert fixed cost to variable.
- Benefit from a supplier's investment and innovation.

Outsourcing IT gives an organization the option of not investing in something that is not one of its core processes. Managing the IT infrastructure is not a core activity for many organizations; however, it can expend valuable assets such as time and manpower. By outsourcing IT, an organization can remove management from the distraction of dealing with the organization's peripheral activities (Lonsdale & Cox, 1998).

Cost reduction is one of the influential forces to outsourcing. By outsourcing IT, areas that were once fixed cost have now become variable costs. Since technology changes rapidly, IT outsourcing can shorten the learning curve of new technologies and decrease the cost spent on training.

It can be difficult to keep pace with technological advances, so most organizations outsource IT to vendors who are resident experts in their particular field. The outsourced IT can have high-quality input all along its primary supply chains, and highly efficient support services—without the level of investment that would have been

necessary if it had retained provision in house (Lonsdale & Cox, 1998). British Petroleum (BP) is an example of an organization that has decided to outsource all of its IT operations to an outside supplier.

c. Disadvantages of Outsourcing

According to Aubert, Patry, and Rivard (1998), the contractual arrangements and decisions associated with successful IT outsourcing involves risks and, therefore, it is important to forecast the associated risks and implement measures that will prevent them from occurring.

In their qualitative research on outsourcing, Harland et al. conducted a Delphi study to understand the risks and rewards of outsourcing and concluded that one of the major motivations for outsourcing is that an organization can focus more attention on competencies. However, the hidden costs are the biggest problem of IT outsourcing. Transition costs (which include setup costs, redeployment costs, relocation costs, and parallel-running costs) and management costs (which refer to the human resources invested in managing an outsourcing contract) can increase quite rapidly over a period of time, and most companies underestimate these two types of cost (Earl, 1996). In addition to transition costs and management costs, contracting costs and other types of hidden costs, such as maintenance on personal computers and sales tax on equipment purchases, can add up to a large sum of money that the client assumed were included in the contract, but were not (Feeny, Lacity, & Willcocks, 1995).

Furthermore, handing over critical activities to the outsourcing vendor can have detrimental effects upon on an organization because it can lead to an unhealthy balance of power. As stated by James Bucki, "whether you sign a contract to have another company perform the function of an entire department or single task, you are turning the management and control of that function over to another company (Bucki, page 1, n.d.)." Although there is a contract, the managerial control will belong to another company. Your outsourcing company will not be driven by the same standards and mission that drives your company. They will be driven to make a profit from the services that they are providing to you and other businesses like yours (Bucki, n.d.).

The primary concerns that IT outsourcing can expose an organization to is the loss of control over service level and service quality. Once an organization outsources an IT service, factors such as the project scope, costs, technologies, and IT direction may be extended beyond direct managerial control by the outsourcing company and fall into that of the vendor. When a huge gap exists between the client organization's knowledge of services and the vendor's knowledge, control becomes very difficult to gauge or even maintain. Consequently, client organizations have difficulty validating any claims that vendor organizations make, since they may not have access to vital information possessed by the vendor (Chen & Perry, 2003).

Security concerns can be considered another disadvantage of IT outsourcing. As a result of outsourcing, critical data may be stored in a facility outside the client organization, and the network-connected information systems of the client organization and those of the vendor may subsequently be subjected to security threats. Also, if the major technology infrastructure of vendors is shared by multiple client organizations, there can be many sources of security threats. In addressing security threats, factors such as personnel training and background screening of IT personnel are essential (Chen & Perry, 2003). It is important for organizations to strictly adhere to their IT security plans, and update them as necessary to ensure that outsourcing policy and guidelines are included.

It should be noted that the complexity of relationship management is usually underestimated. The management and maintenance of an outsourcing contractual relationship poses some risks. Organizations need to transfer their personnel and technical resources to the vendor after the contract is negotiated. If not prepared properly, client organizations will likely run into problems of poor service quality or a mismatch between organizational needs and service provided by vendors. IT outsourcing arrangements may function efficiently, but not in alignment with the organization's strategic goals if the transfer of knowledge about the existing system or needs for a new system at various levels of the organization is ignored or done poorly. The lack of a joint problem-solving mechanism and poor communication may cause missed opportunities for early detection of a problem and continuous improvement (Chen & Perry, 2003).

d. British Petroleum (BP) Case study

BP was founded over 100 years ago and has become one of the leaders in the oil industry. The U.K.-based company has active exploration and production projects in 25 countries, pumps about 5% of the world's oil production, and BP owns 18 refineries and more than 24,600 service stations in 100 countries (Oracle, 2008). BP outsourced all of its IT operations in 1993, but instead of awarding the contract to one supplier, BP acquired the services of three vendors. Each of the three suppliers were required to work together in order to provide flawless service to BP's network, which consist of 42 businesses around the world (Cross, 1995).

Just as other companies, BP was aware of some of the benefits of outsourcing IT functions such as cost cutting, increased flexibility, specialization, and higher-quality services. Before making the decision to outsource its IT operations, representatives from BP visited a number of different companies who had previously outsourced IT, only to conclude that outsourcing IT to one supplier was not suitable. BP believed that only outsourcing to a single supplier would be a mistake, as the other organizations became too reliant on the supplier's skills, management, and technology.

After using a few minor contracts over several years, BP gain some experience in handling outsourcing contracts. Before handing over IT operations to external suppliers, BP devoted time and effort to ensure that the entire organization was able to grasp the concepts of the proposed outsourcing process. Now it was time for BP to turn to the market and interview potential suppliers. During the interview process, BP met with companies from both the U.S. and Europe, from which a handful were chosen as the finalists. The contract was awarded to a group of three suppliers that included Sema Group, Science Applications International Corporation (SAIC), and Syncordia. BP was able to sign a separate contract with each vendor. These three companies were chosen because they were able to balance the service and expertise of one another, allocate responsibility for each company, and make sure that the integration and operations were seamless. By testing the market and asking suppliers to create solutions

to meet its needs, BP was able to get the best of both worlds—competitive prices and services, and cooperation between suppliers—without the significant hold-up threat that outsourcing often entails (Cross, 1995).

D. SUMMARY

In this chapter, the strategic planning for IT was outlined. The role of IT in most organizations is to automate business core processes, reduce operating cost, improve productivity, and ultimately to build compound and sustain a competitive advantage. The successful incorporation of IT within an organization is highly dependent upon the effort that is put into strategic planning. Again, it is those organizations that include IT in their overall strategy that are best suited to leverage the advantages of strategic planning. The strategic planning process for deriving an IT strategy covers three areas; assessment, strategy, and execution all being of equal importance, but with different priorities based on the level of IT maturity for an organization. Outsourcing, ERP, and EA are three of the more prevalent strategic approaches to managing IT and have been proven to be effective in governmental and non-governmental organizations. Over the last decade, the DoD has tried and still utilizes all three approaches in some form or fashion throughout its enterprise. In the next chapter, the CNSF organization will be outlined, as well as some of the key differences and similarities in IT management between the CNSL and CNSP N6 department.

III. ASSESSMENT OF COMMANDER NAVAL SURFACE FORCES (CNSF) AS AN ORGANIZATION

A. BACKGROUND

1. History

This section summarizes the history of CNSF (CNSF Public Affairs Officer (PAO) I, n.d.). The Surface Force was created in a developmental status on January 1, 1975. The Pacific Fleet's Amphibious Force, Cruiser-Destroyer Force and Service Force merged on 1 April 1975 to form the Surface Force staff. The Surface Force became fully operational on 1 July 1975. Below is a summarized timeline of changes that Naval Surface Forces has undergone since 2001 (CNSF, 2009):

- On 1 October 2001, the Chief of Naval Operations (CNO) designated CINCLANTFLT as Commander, Fleet Forces Command (COMFLTFORCOM or CFFC). The CFFC was given responsibility for the overall coordination, establishment, and implementation of integrated requirements and policies for manning, equipping, and training Atlantic and Pacific Fleet units during the inter-deployment training cycle.

- In October 2004, CFFC established Type Commanders (TYCOMS) on opposite coasts. Commander, Naval Surface Forces (COMNAVSURFOR or CNSF) was established with a three-star Admiral in charge and was dual-hatted as Commander, Naval Surface Force Pacific (COMNAVSURFPAC or CNSP), while Commander, Naval Surface Force Atlantic (COMNAVSURFLANT or CNSL) was to be led by a two-star Admiral. The initial concept was strategized as CNSF providing policy guidance and CNSL providing current readiness oversight for all Surface Forces (SURFOR) ships.

- In November 2005, CNSF stood up the Surface Warfare Enterprise (SWE) with the mission of developing versatile, well-maintained, well-trained Surface Force ships, combatant craft, and Sailors to quickly deploy in support of Combatant Commanders tasking through collaboration across all stakeholders.

- On 23 May 2006, the CNO disestablished the Commander, Fleet Forces Command (COMFLTFORCOM) and Commander, U.S. Atlantic Fleet (COMLANTFLT) and renamed COMLANTFLT to Commander, U.S. Fleet Forces Command (COMUSFLTFORCOM, or CUSFF), ordered to

carry out the missions performed by COMFLTFORCOM and COMLANTFLT and serve as primary advocate for fleet personnel, training, requirements, maintenance, and operational issues. A two star Admiral would be responsible for reporting administratively directly to the CNO.

- Also in 2006 the SWE stood up and reinforced that CNSL was assigned the additional duty of Current Readiness Officer (CRO), and established Class Squadrons (CLASSRONs) as direct reports under the CRO.

- On 21 August 2007, CUSFF/CPF Instruction 3000.15 established the Fleet Response Plan to replace the inter-deployment training cycle, identifying roles and responsibilities for Force/TYCOMS to administratively oversee that the units assigned are meeting the goals of certification.

- On 20 July 2009 CUSFF/Commander, Pacific Fleet (CPF) Instruction 3501.3B established the Fleet Training Continuum, stating that under normal circumstances TYCOMs have administrative control, but ISICs are also responsible for monitoring the progress and proficiency of assigned units.

2. Mission

CNSF is a shore-based command whose overall mission states:

> SURFOR provides operational commanders with well-trained, highly effective, and technologically superior surface ships and Sailors. To sustain peak levels of combat readiness, SURFOR equips its forces with the necessary training, tools, maintenance and material to successfully accomplish their mission -- across the entire spectrum of warfare operations (CNSF PAO I, n.d.).

CNSF reports directly to Commander, U.S. Pacific Fleet (CPF). CNSF is in the administrative chain of command of assigned forces and conducts training, provides for logistic support, and exercises operational control of forces not assigned to other commanders as directed by CPF. CNSF is in charge of providing maximum support to the Combatant Commander in order to maintain all units of the Force in the optimum state of training, readiness, discipline and morale in order to maintain a maximum degree of readiness for war.

In order to maintain a high level of combat readiness, CNSF provides the surface fleet with the essential training, tools, maintenance, material, and personnel necessary to

successfully accomplish their mission across an array of warfare operations. CNSF includes surface ships and support/maintenance commands that are necessary to coordinate the manning, training, equipping, and sustaining of Navy and Marine Corps fighting forces.

3. Responsibilities

CNSF is in charge of the overall management of Naval Surface Force training, policy, procedures, and requirements (CNSF PAO II, n.d.). CNSF administers over 250 surface ships of the U.S. Atlantic and Pacific Fleets that are based in: Bahrain; Bremerton and Everett, Washington; Norfolk, Virginia; Mayport, Florida; San Diego, California; Pearl Harbor, Hawaii; Sasebo and Yokosuka, Japan. The staff of CNSF includes over 200 military and 100 civilians and is responsible for the readiness of Naval surface ships in both the Atlantic and Pacific Fleets. These ships include cruisers, destroyers, frigates, and amphibious assault ships. Below is a summarized list of Naval Surface Forces' responsibilities as Surface TYCOM and SWE Commander (CNSF Instruction, 2007):

- Development of new or revised training evolutions and their subsequent publication through the appropriate means.
- Identification of training support service requirements, to be provided by other commands, for surface units.
- Review of the Surface Force Training Program on an annual basis.
- Ensure that training is standardized by coordinating with other TYCOMs.
- Provide the Afloat Training Groups (ATG) with Surface Force training.

B. ORGANIZATIONAL STRUCTURE

The objective of this section is to clearly identify the organizational structure for CNSF, to include the CNSP and CNSL staffs. Although the transformation and organizational restructuring that CNSF has undertaken in the last few years is confusing to some, the priority has remained on allowing CNSF to effectively and efficiently accomplish the mission while avoiding misalignment and duplication of effort.

The CNSF organization, a three-star command, is considered one organization with two staffs. CNSP is designated as the policy writer and CNSL as the supporter of warship readiness. Therefore, the two staffs do not possess concurrent responsibilities, but rather complement each other.

CNSF staffs serve dual roles in regards to operational responsibilities as they are required to operate simultaneously in the SWE framework and as a TYCOM staff depending upon the situation.

CNSF is frequently required to balance Title 10[1] TYCOM accountability with overlapping enterprise responsibilities (CNSF, 2009). Under the current structure of CNSF West Coast CLASSRONs (Cruisers (CG), Littoral Combat Ship (LCS), Landing Platform Dock (LPD), and Mine Countermeasures (MCM)) are under the administrative support of CNSP. East Coast CLASSRONs (Destroyers (DDG), Frigates (FFG), Landing Helicopter Dock (LHD), Patrol Craft (PC), and Assault Craft CLASSRON (CRAFTRON), when formed) are under the administrative support of CNSL. CNSP and CNSL have separate Title 10 lines of accountability to CPF and USFFC, respectively, but must collaborate with each other and their respective CLASSRONs, ATGs, and also with the Surface Warfare Development Group (SWDG). Figures 3 and 4 illustrate the CNSF structure and Title 10 TYCOM reporting lines of responsibility.

1 The United States Code (U.S.C.) is the codification by subject matter of the general and permanent laws of the United States. It is divided by broad subjects into 50 titles and published by the Office of the Law Revision Counsel of the U.S. House of Representatives. Title 10 of the U.S.C. outlines the role of the armed forces. It provides the legal basis for the roles, missions and organization of each of the services, as well as the United States DoD.

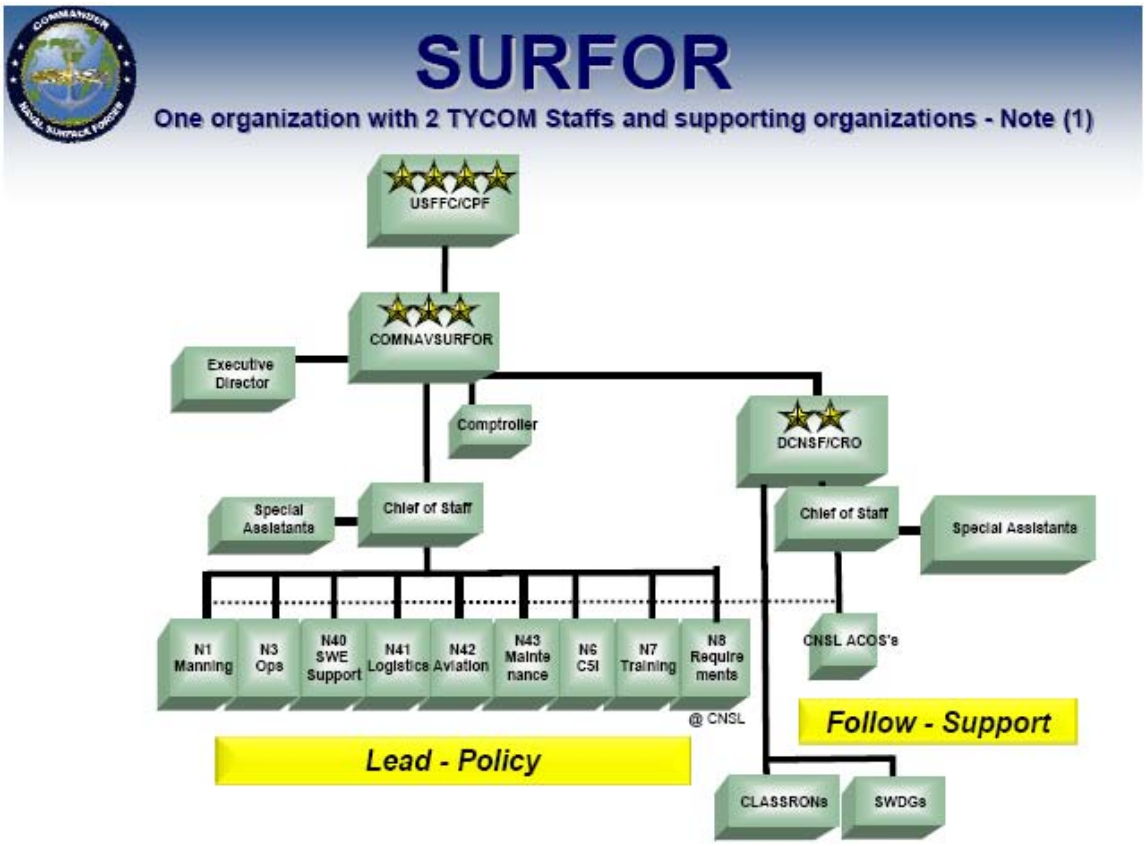

Figure 3. SURFOR Organization (From: CNSF, 2009)

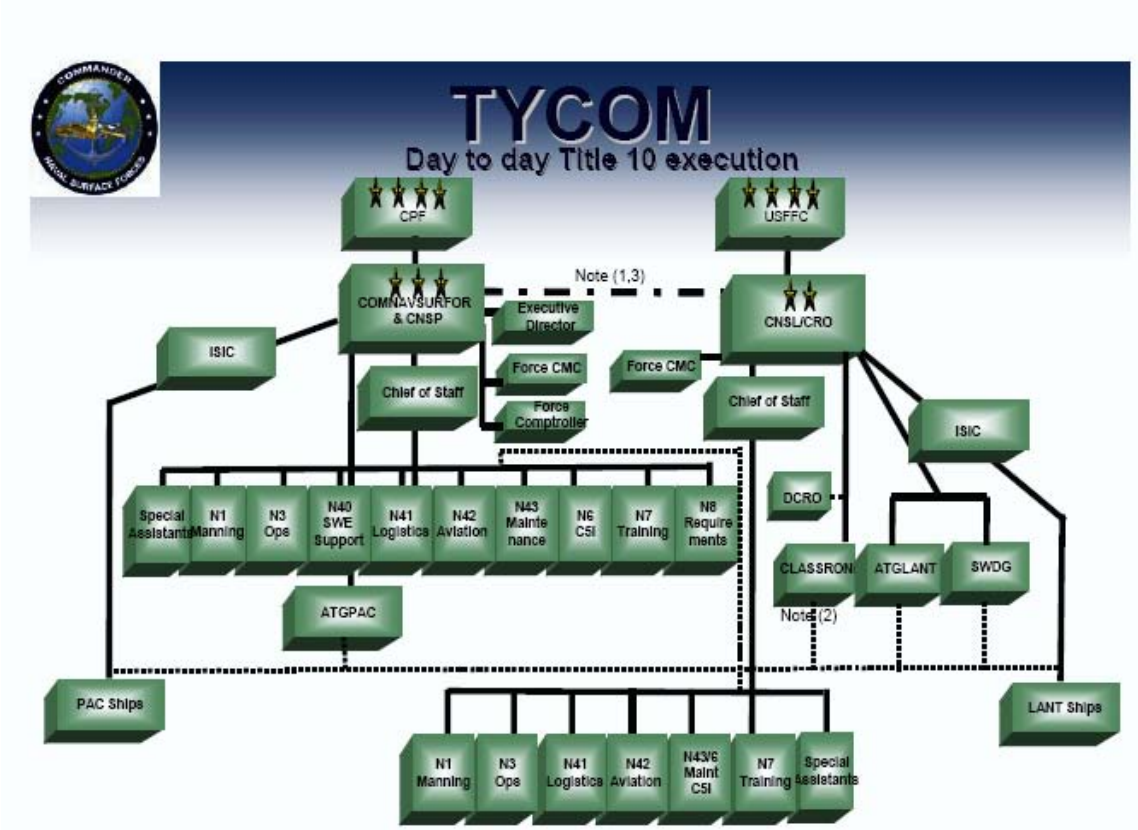

Figure 4. Title 10 TYCOM Organization (From: CNSF, 2009)

The CNSF staff objectives are outlined in the mission statement and by specific duties and responsibilities, to ensure that departments are properly aligned and to reduce redundancy in tasking. Section 1, summarized from the CNSF Battle Orders (CNSF, 2009) describes staff objectives by functional grouping in greater detail. The structure of the staffs on both coasts is essentially the same; however, CNSL staff has been significantly truncated from nearly 300 staff members to only 57, mostly due to the organizational restructuring. CNSL has also merged two N-codes, N43 with the N6. N43 is responsible for maintenance and engineering, whereas the N6 is in charge of Combat Systems and C4I. CNSF staff consists of 300+ employees and incorporates an additional N-code, N40 (Readiness Assessment and Innovation/SWE Enterprise Architecture).

1. CNSF/Commander, Naval Surface Force Pacific (CNSP)

CNSP, as the TYCOM for the Pacific surface ships, is responsible to the Commander, Pacific Fleet for executing Title 10 responsibilities for manning, training, and equipping surface ships. In addition, it reports to the Commander, U.S. Fleet Forces Command (CUSFFC) for tasking; answering any surface warfare request for forces, and also tracks surface ship war-fighting readiness via PAC Fleet Immediate Superior in Command (ISIC) and CLASSRONs. In addition to a dual role as CNSP, CNSF is also the SWE Commander and reports readiness trends and processes improvement efforts to the Fleet Readiness Enterprise (FRP).

2. Deputy CNSF/CNSL

CNSF Atlantic serves as the Deputy Commander, Naval Surface Forces and is responsible to CUSFFC for executing Title 10 responsibilities for manning, training, and equipping East Coast surface ships. As TYCOM, CNSL also reports to CUSFFC for war-fighting readiness and all other administrative concerns relating to Atlantic Fleet ships via Fleet ISICs and CLASSRONs. In addition, as Current Readiness Officer (CRO), it monitors the readiness of all U.S. Navy surface ships. This entails metric development, tracking, and analysis, through the CLASSRONs, as well as collaborating with the SWE Cross Functional Teams (CFT), as required.

3. Executive Director (ED)/Strategic Financial Director (SFD)

The Senior Executive Service (SES) Executive Director, dual-hatted as the SFD or, in business terms, Chief Financial Officer (CFO), reports directly to CNSF as the senior civil servant on the staff. The SES provides executive oversight in the definition of processes that allow Surface Forces to understand cost structure; set tactical and strategic financial plans; and measure/report costs, expenditures, and savings across Supply and Equipage (S&E) as well as Maintenance funds. Operating under the Navy's Planning, Programming, Budgeting and Execution (PPBE) system; the SES defines and executes the processes that allow the SWE to make and execute strategic financial plans.

4. Immediate Superiors in Command (ISICs)

ISICs are subordinate to the TYCOMs, and responsible to them for their respective ships' readiness. ISICs include Destroyer Squadrons (DESRONs), Amphibious Squadrons (PHIBRONs), Carrier Strike Groups (CSGs), and Expeditionary Strike Groups (ESGs).

5. Afloat Training Groups (ATG)

These organizations, subordinate to the TYCOMs, are tasked with the training of warships in the pre-deployment phase. In addition, they conduct certifications that graduate surface ships to the deployment phase.

6. Class Squadrons (CLASSRONS)

CLASSRONs work with each CNSF N-Code staff, and particularly with the CRO, to identify and solve fleet-wide readiness problems. The CNSL TYCOM staff is dual-hatted as the CRO staff, thus, they are the initial coordination point for CLASSRON issues.

7. N00F-Force Comptroller

The Comptroller is responsible to CNSF for fiscal accountability and ensuring that the proper distribution of funding is achieved. In addition, the Comptroller submits future budget requests as required. The Comptroller Department, Code N00F, is led by a DoN civilian, located at CNSF headquarters, who manages two staffs, one on either coast. This is the only code within CNSF that differs from the two staff construct. Due to the unique fiscal responsibility of the position, the Comptroller is the only department head charged with managing operations on both coasts.

8. N1–Manpower and Personnel

The Manpower and Personnel code is responsible for Current Readiness under its TYCOM role and Future Readiness in its CNSF/SWE/ Personnel Readiness Team (PRT) role. Specifically, CNSL N1 is the manpower and personnel lead; reporting directly to the CRO and leads manning initiatives for LANT Fleet. CNSP N1 is in charge of the Fleet

Program Objectives Memorandum (POM)/Program Review (PR), civilian programs, and Personnel Support Detachment (PSD) afloat tasking while also leading manning efforts for PAC Fleet.

9. N3–Operations and Plans

The N3 Department roles are the same for both staffs. CNSP/L N3s coordinate intelligence (INTEL) and Global Force Management (GFM) Resourcing, and DRRS-N tracking for each TYCOM.

10. N41–Supply and Logistics

In its traditional (Title 10) TYCOM roles, N41 staffs (LANT/PAC) are responsible for assisting ships in their respective Areas of Responsibility (AORs) with swift resolution of high-priority and emergent requirements, both material and non-material related. CNSP N41 serves as the lead activity for the development and promulgation of Supply, Ordnance, Combat Cargo and Safety-related plans and policy while CNSL N41 leads in assessing and developing solutions for systemic logistics support issues.

11. N6–Combat Systems and C4I

Both CNSF TYCOMs have N6 staffs with different objectives and responsibilities. The primary attention of CNSP N6 is the future readiness of the fleet's C5I capabilities, while the CNSL N6 is focused on the current C5I readiness of the fleet. In addition, CNSL N6, supported by CNSP N6, is charged with the collection and distribution of all operationally significant ships' readiness data (e.g., casualty reports [CASREPs]). The N6 organization of CNSF is responsible for the identification of requirements, maintenance, and future procurement of IT systems. A more descriptive overview of the N6 Department, specifically in regard to IT management, will be presented in section D of this chapter.

12. N7–Training and Readiness

The primary responsibility for CNSP and CNSL N7 is the development of training policy for the fleet. Their secondary responsibility is monitoring the training readiness of the fleet. Similar to the other codes, CNSP is designated as the lead for this effort, while CNSL is the follow staff.

13. N8–Force Requirements and Assessments

Under the direction of USFF, the CNSF ACOS for Warfare Requirements and Assessment (N8) resides in Norfolk, Virginia and, therefore the majority of the CNSF N8 staff is on-site in the Norfolk offices of CNSL, where they maintain direct, personal working relationships with their counterparts on the USFF staff. The functions of the Department are varied, but mostly cover the following areas: coordination with the SWE Strategic Financial Management CFT to lead the Force's Planning, Programming, Budgeting, and Execution efforts; development and tracking of metrics for both individual-, unit-, and force-level requirements; and management of the organization's Joint Capability Integration and Development System (Commander, Naval Surface Forces, 2009).

C. SURFACE WARFARE ENTERPRISE (SWE) STRATEGY

The concept of viewing the United States military as an "enterprise" is a supporting initiative within the DoD and is included in the DoN's transformation agenda. The Chief of Naval Operations (CNO) directed the Navy to investigate ways in which to improve its return on investment (ROI) in an effort to help offset the DoN's growing financial challenges. In response, the Navy established the Fleet Readiness Enterprise and mandated the institution of five Navy Warfare Enterprises, including the Surface Warfare Enterprise. Formed in November 2005, the SWE is led by CNSF and has, at its core, the goal of sustaining peak levels of war-fighting readiness (CNSF PAO III, n.d.).

The SWE maintains and enhances the Naval Surface Fleet's readiness by building the force of the future while sustaining and improving our current readiness. The SWE is committed to leading, directing, and prioritizing changes to current Navy business processes so that multiple organizations, functioning as a single transparent enterprise,

can effectively provide the right components of the Naval Surface Force at the right time, in the right place, and at the right cost. By breaking through organizational barriers, issues can be identified and addressed at an enterprise level, resulting in more effective and efficient solutions (CNSF SWE, 2008). Figure 5 illustrates the SWE structure. The SWE focus is clear cut and is based on four key themes:

- Warfighting Readiness
- Dealing with Fiscal Realities
- Managing to the Right Metrics
- Synchronization of Efforts

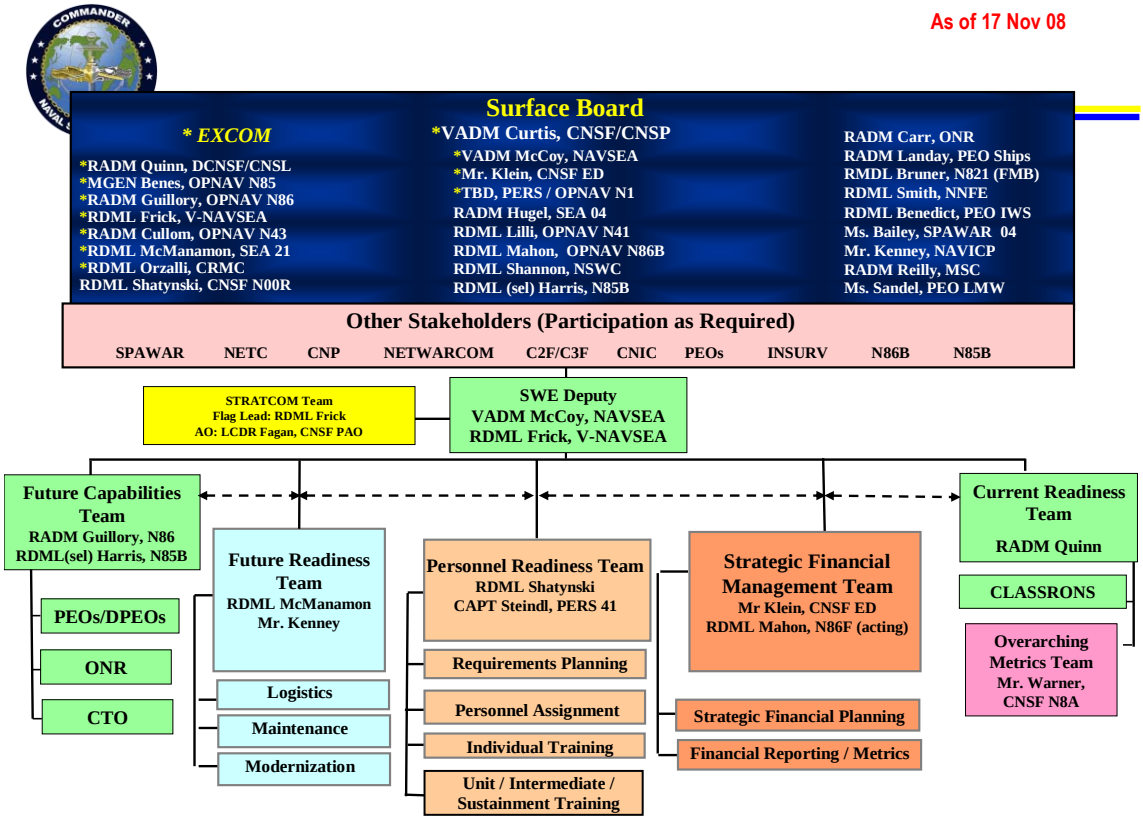

Figure 5. SWE Structure (From: CNSF SWE, 2008)

1. CNSF/SWE Strategic Plan

As mentioned in Chapter II, an organization must first establish a well-defined strategic plan that includes their mission statement, goals and objectives, and generally

lays out the way ahead for the organization. From this concept, an IT strategy can be developed. In this section, we will describe the SWE's strategic plan, in which CNSF has aligned itself with and, in fact, is the lead in carrying out this strategy.

As mentioned in Chapter II of this paper, an organization must first establish a well defined strategic plan that includes their mission statement, goals and objectives, and generally lays out the way ahead for the organization. In developing the strategic plan, an organization is forced to analyze themselves, looking internally at who they are as an organization and determine the direction in which the organization wants to go.

The SWE strategic plan states that the main focus of SWE and COMNAVSURFOR is to provide the Surface Navy with trained sailors and task-ready warships to accomplish assigned missions through a collaborative enterprise process that balances risk and ROI. The SWE strategic plan for fiscal (FY) 2009 (SWE Strategic Plan, 2008) describes the following six objectives with associated initiatives:

- Produce prescribed levels of war-fighting readiness, based on USFF defined demand signals.

- Deliver and retain a diverse mix of the right people with the required competencies and proficiencies—in the right place, at the right time, for the right value—balancing cost and readiness, while adhering to the SWE values.

- Establish an enterprise financial management process that enables the SWE to more effectively allocate and manage its financial resources to support current readiness and future capabilities.

- Implement standardized cost management processes and financial metrics to drive increased productivity.

- Improve enterprise maturity and execution through the development of relationships with SWE partners, in particular providers and enablers.

Being that CNSF is the lead organization and is designated the SWE Commander, it is understandable that strategically aligning one's own operations, both short and long term, to support the enterprise (SWE) would make sense. However, it is important that every organization and/or command generate a strategic plan that is tailored to support its

own goals and objectives, and that will provide strategic guidance as to how the organization will go about supporting and augmenting the needs of the enterprise.

D. CNSF IT ORGANIZATIONAL PLAN

1. DoN IM/IT Strategic Guidance

In FY 2008–2009, the DoN Chief Information Officer (CIO) developed the Department of the DoN IM and IT Strategic Plan. The purpose of this document was to clearly describe the DoN's vision, mission, governing principles, goals, objectives, and key performance indicators for IM and IT to assist the war-fighter. This strategic plan is driven by, and aligned to, the overarching goals expressed by the Secretary of the Navy. The intent of this plan is to assist the DoN's leadership by providing a vision that describes the desired outcome and identifies how they will be achieved and measured. This plan is also intended to help strengthen the alignment of subordinate commands with the DoN's IM/IT goals and help clarify resource priorities. Additionally, the plan is designed to provide IM/IT personnel with a clear understanding of the direction of IM/IT in the DoN, and how their contributions support this vision. The intention of the DoN IM/IT Strategic Plan is to provide a method of aligning core processes with IT and identifies how these objectives will be accomplished and measured (U.S. DoN CIO, 2008).

During our research for this thesis of the IT structure and organizational makeup of CNSF, we came to the realization that CNSF does not have an IT strategy. For the last few years, CNSF has been able to utilize IT systems, applications, and infrastructure in an effective, but not necessarily efficient, manner by aligning itself with the DoN IM/IT Strategic Plan and the National Security Personnel. The DoN IM/IT Strategic Plan states that the Navy must be smarter about leveraging our limited resources through effective IM/IT governance should efficiently manage our application portfolio, requiring a clear strategic or financial return for each IM/IT investment and move from decentralized to centralized management where it makes sense. For an organization such as CNSF to be effective in each of these areas, there has to be strategic guidance in place that identifies a cost-effective way to use IT to assist in the achievement of CNSF mission objectives and goals. Executive–level oversight must be present in the IT decision-making process and

upper-level managers, with input from IT personnel, must develop a strategy that is understood and adhered to throughout the organization.

2. CNSF N6 Organization

As stated earlier, CNSF has been divided into two staffs, with CNSP on the West Coast and CNSL on the East Coast. Each TYCOM staff has a designated N6 who is in charge of the command, control, communications, computers, combat systems and intelligence (C5I) systems for afloat and ashore information systems. As an integral part of command and control systems, Naval C5I systems are the information systems, equipment, software, and infrastructure that enable the commander to employ authority and guidance to assigned assets. Additionally, C5I systems help the commander observe and influence the actions of his forces through the chain of command (NDP, 1995). Within CNSF it is hard to pinpoint who is in charge of IT in terms of strategic management, due the dynamics of the N6 Department. For a comparison, Figures 6 and 7 illustrate how the N6 Departments at CNSP and CNSL differ. Below is a summarized list of responsibilities of the CNSP N6 Department:

- N60 – C5I Life Cycle Manager. Responsible for C5I modernization, the process for C5I life cycle management (LCM) issue identification and resolution, and the Navy's 2M (miniature/micro miniature) program.

- N64 – Ashore C4I. Responsible for managing NMCI for CNSF, CNSF messaging, PC support Afloat, and CNSF HQ IT Equipment Manager.

- N65 – Combat Systems. Responsible for providing subject matter expert (SME) support for all Combat Systems equipment (AAW, ASW, and ASUW) and N6's direct liaison for modernization programs.

- N66 – Force Afloat C4I. Responsible for providing SME support for all Combat Systems equipment (communications), direct liaison with fleet C4I stakeholders, and N43/N6 liaison officer.

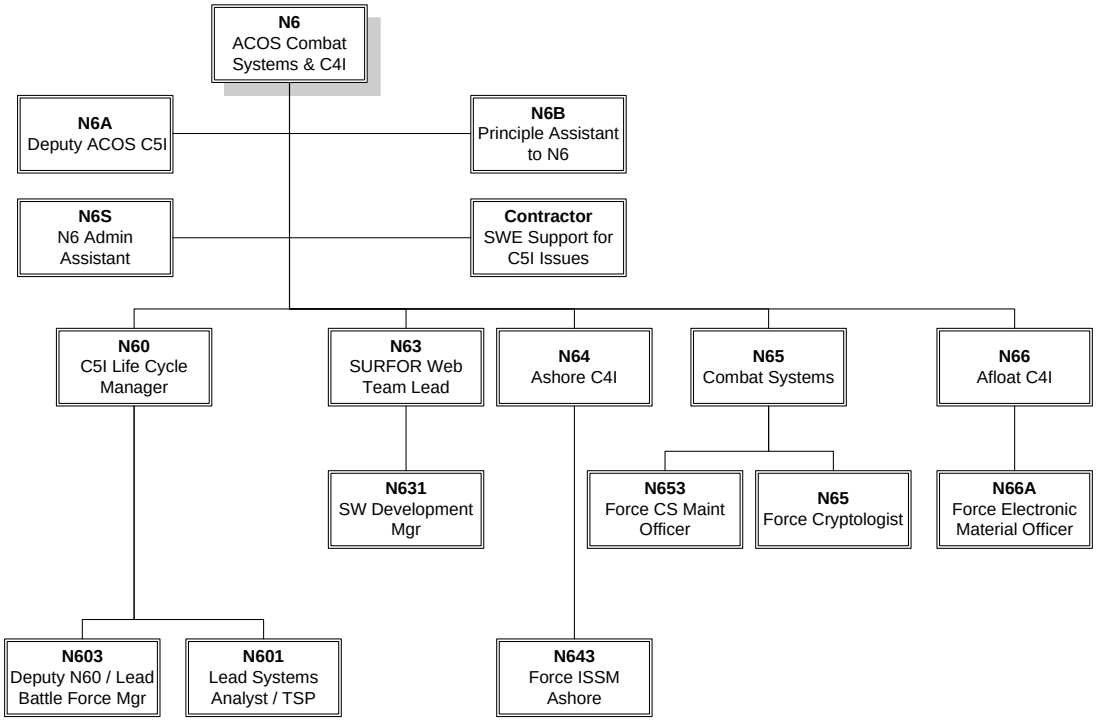

Figure 6. CNSF PAC N6 Organization Chart

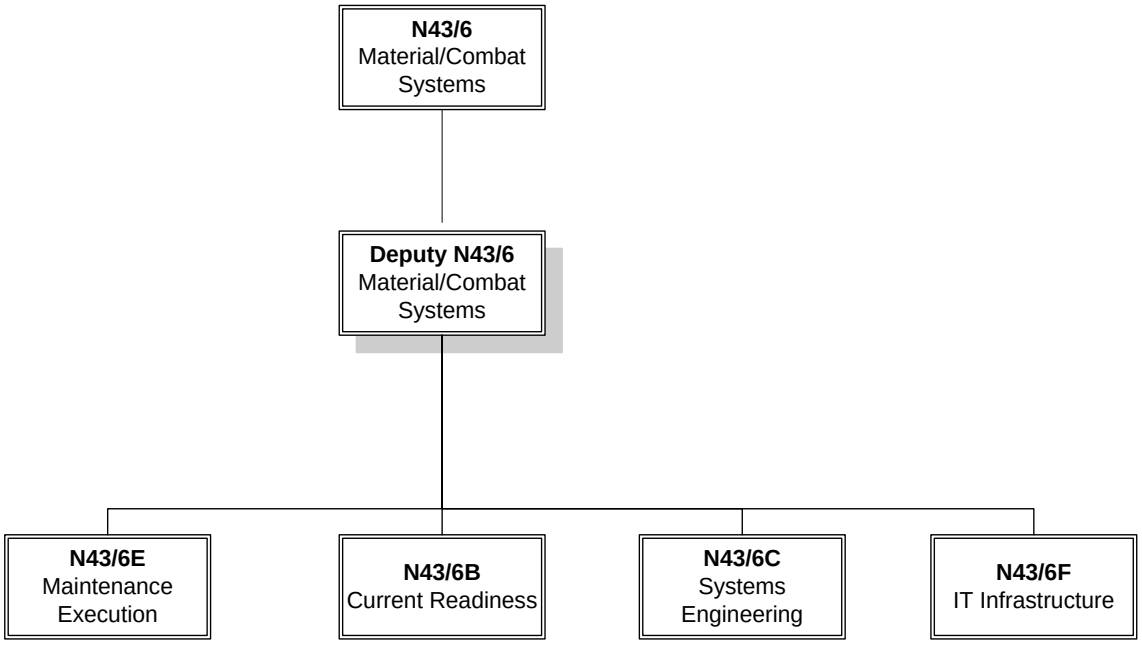

Figure 7. CNSF LANT N43/N6 Organizational Chart

Within the N6 Department, the N64 shop is in charge of Ashore C4I and is essentially the lead in for support and maintenance for IT systems, applications, and infrastructure for CNSF HQ staff and subordinate organizations. The N64 lead is a civilian but within the shop are military IT personnel, government contractors, and other civil service members. Due to the difference in responsibility (e.g., future versus current readiness), the CNSL and CNSF/CNSP N64 shops are manned and structured differently.

The CNSF N64 Division Head functions as the Ashore Director for Information Systems and Technology and is titled the Chief Information Officer (CNSL only). As the Primary Assistant (PA) to N6, the N64 is responsible for providing broad, multidisciplinary technical expertise for data communications design and engineering requirements in support of all surface ships, afloat staffs, and shore activities. The CNSL CIO/N64 coordinates closely with the N64 in order to align enterprise information resources with the mission. CNSL N64/CIO supervises, directs and implements local and Enterprise Net and Web development projects as assigned. Currently SURFOR WEB, this responsibility on the CNSP side of the house is given to the N63 who is the lead for SURFOR WEB development, maintenance, etc.

N64 oversees the acquisition of IT equipment and services, in accordance with IT architecture and established DoN acquisition policy. The N64 is the technical expert and coordinates efforts for IT, software, and telecommunications planning, acquisition, implementation, and operations for CNSL/P HQ staff and claimancy. As Division Head, the N64 provides primary HQ staff network and computer (IT) shore infrastructure. Additionally, the N64 sustains the requirements set for by the Navy Marine Corps Infrastructure (NMCI), supplies network security and Information Assurance Radio Communications/Message Center supervision, and headquarters Video Teleconference Center (VTC) maintenance/operations support. Other responsibilities include direct and continuous liaison between NMCI technical representatives (NMCI Base Operations) and NMCI contractor corporate representatives for sustained operational capabilities of the NMCI Enterprise serving CNSL. CNSL CIO/N64 manages IT lifecycle replacement, budgets and plans CNSL IT funding strategy, and formulates policy and financial plans for the capital and operational costs associated with the IT infrastructure, to include

associated appropriations and the IT budget, as well as the oversight of financial obligations associated with CNSL IT infrastructure procurements (Kamien, 2010).

CNSF/CNSP N64 responsibilities are essentially the same as that of its counterpart division within CNSL. The CNSF/CNSP N64 staff incorporates more personnel due to its dual–hatted position as TYCOM and SWE Commander. Another major difference is that SURFOR WEB responsibility does not fall under N64 but is given its own division (N63). CNSL N64/CIO has less manpower, yet more responsibilities than its counterpart at CNSF/P. Figures 8 and 9 display the differences between CNSL's N64 Division and CNSF/P's N63/64 Division (Kamien, 2010).

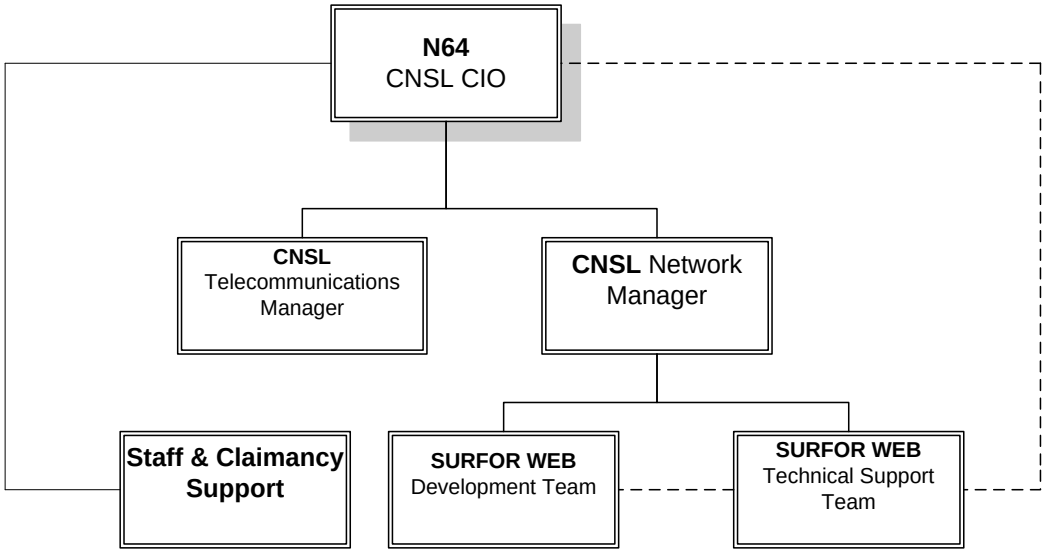

Figure 8. CNSL N64 Organization Chart

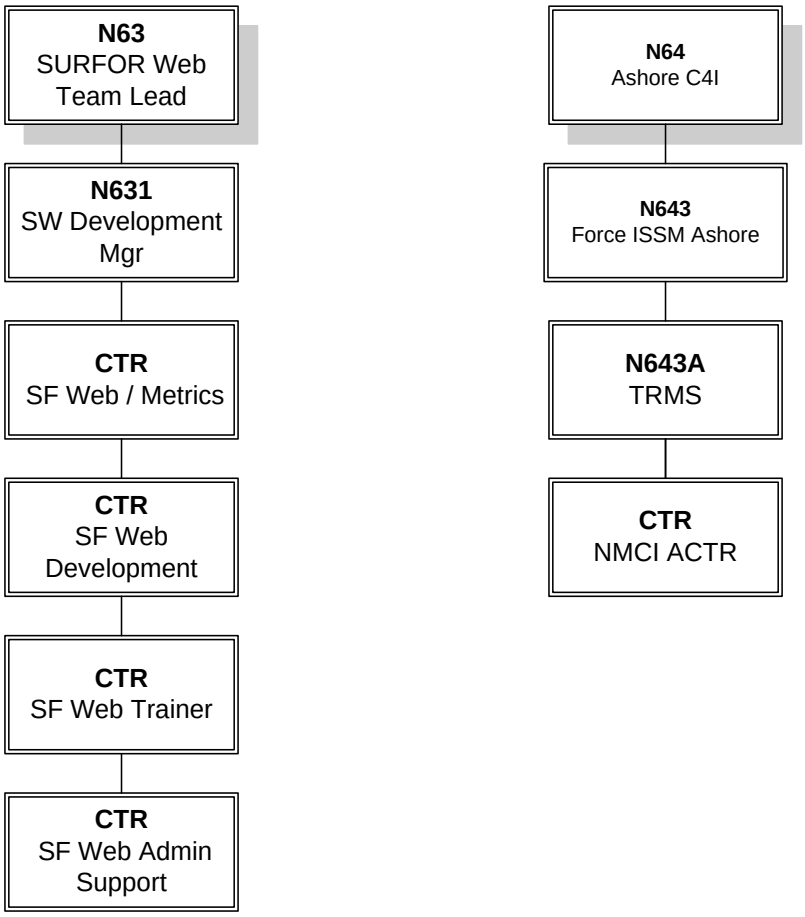

Figure 9. CNSF N63 and N64 Breakdown

For the scope of the research performed in conjunction with the request of the Deputy Comptroller, only three IT applications/programs funded by CNSF were analyzed. These were three of the more costly applications and are considered internal programs for management sake, but all three are connected with external stakeholders in some form. The three applications in question were to be looked at in an effort to possibly consolidate them into one contract instead of three separate ones. The consolidation of contracts could also prevent a duplication of effort by CNSL and CNSP, which could result in saving CNSF millions of dollars.

3. Training and Operational Readiness Information Services (TORIS)

TORIS, a $2.3 million per year program, directly supports Fleet training readiness. It is a Web-centric data-engine that receives inputs from afloat and ashore

units. TORIS is a non NMCI application that stores, displays, and transmits the data to external information systems on request. Its primary objective is to monitor the training readiness of the surface force. Strategic implications of applications for TORIS is that it provides ATG with an automated, integrated assessment tool that will provide ISICs and TYCOMs with a snapshot of afloat units' training readiness.

TORIS was developed immediately following the terrorist attacks of 9/11. At the time, a requirement was identified to provide an immediate visual of the current training readiness of the surface fleet to leadership. The intent of the program, the development task of which was delegated to mobilized reservists, was to enable the ISIC and TYCOMs to be able to identify warships ready for deployment to the Combatant Commanders. It did so by providing Commanding Officers at the unit level with a current view of their ship's training readiness, which it compared to the ATG's required metrics (CNSF TORIS, 2008).

TORIS is a very reliable application, but as it currently stands, adds no value to the CNSF's N6 Department. While TORIS is a hardware and software IT system, it is software intensive. This is because it is essentially a suite of software systems, bundled together in one user interface, managed by four hardware servers. The complexity of the system grows as the interaction between the software systems increase, thus forcing TORIS system developers to actively perform design functions that support system agility. Spending for TORIS comes directly out of the N6's budget, but the N6 Department is neither a maintainer nor user of the application, and has no input with regard to increases or decreases in spending.

4. Continuous Monitoring Program (CMP)

CMP, a $1 million per year program, improves Fleet readiness, while reducing man-hours spent on tedious data entry and analysis. Created in 1998, CMP was intended as an information system that would provide two solutions to the Fleet. The first solution was designed to act as a management tool for shipboard Supply Department personnel to quickly identify specific discrepancies within the Stores (S-1) and the Food Service Divisions (S-2). Additionally, CMP was intended to provide a quick and effective means of evaluation of the current Supply Department readiness of individual ships, squadrons,

and classes. The CMP data submission allowed supervisors on shore remote access to the readiness and overall health of the Supply Department. It also could be run by onboard inspectors and support teams as a means of either conducting or preparing for an official naval inspection.

CMP is a software and hardware system that transmits precise and current supply and financial management data to and from ships, submarines under the purview of CNSF, and shore establishments. Its goal is to improve readiness, while reducing man hours by automating key data draw-downs and tedious manual data entry. The efficient and effective nature of the system has the added benefit of reducing man hours spent, either onboard or on shore, analyzing a ship's current data for trouble spots. As estimated by system developers, the automation process provides data in minutes as opposed to two weeks (CNSF CMP, 2008).

Like TORIS, CMP is a very reliable application, but it also does not add any value to the CNSF's N6 Department. All of CMP's equipment, data, and software are government–owned and contractor–operated, but spending for CMP comes directly out of the N6's budget. In addition to TORIS, the N6 Department is neither a maintainer nor user of the application, and has no input with regard to increases or decreases in spending.

5. Surface Forces Web (SURFOR WEB)

CNSF Web, a $2.2 million per year program, aligns the surface force to match the objectives set by CNSF. It accomplishes this by providing the means for all echelons of command within the organization to effectively, efficiently, and securely communicate via the web. CNSF Web is a knowledge management system. The purpose of SURFOR WEB is to provide CNSF, its surface ships, and its subordinate commands with a web-based collaboration system. This integrated system will be centralized, content driven, and have secure and non-secure areas (CNSF SURFOR WEB, 2008).

The original development for CNSF Web stems from a CNSF staff knowledge management study conducted in 1999. The study found through requirements analysis processes, that a government owned, Web-based, collaboration toolset to provide a central location for all organizational knowledge was desirable for mission support.

Specific requirements included the ability to be searchable across domains and be both Nonsecure Internet Protocol Router Network (NIPRNet) and Secure Internet Protocol Router Network (SIPRNet) capable. In late 2000, funded by its staff budget, the CNSP Knowledge Manager established the initial beginnings of the CNSF Web, built on the Microsoft SharePoint Portal System.

SURFOR WEB falls directly under the N6 Department that allows organizations to target information and update audiences based on their organizational role, team membership, interest, security group, or any other membership criteria that can be defined. The primary mission support function of the CNSF Web is force alignment. It does so by linking the primary staff functions of all echelons within the chain of command, from the deckplate level to the CNSF, in one electronic location. Additionally, SURFOR WEB provides the resource for staffs to: publish policies and directives, follow various operational metrics, and communicate with each other on pertinent topics.

E. SUMMARY

In this chapter, CNSF was outlined as an organization. The role of CNSF is to man, train, and equip the surface fleet to conduct combat operations at sea (CNSF Instruction, 2007). In order to accomplish this task, CNSF has increased the role IT of within its day–to–day operations. For CNSF to ascend to the forefront of preparing war ships for tasking, they must realize that IT is now recognized as a critical business discipline that is central to all business activities. To create value from IT, an organization needs to understand the role that IT plays. In the 21st century and beyond, IT plays an integral role that is involved in all functions of an organization because IT has essentially become the organization's nervous system (Chew & Gottschalk, 2009). Chapter IV will examine some of the laws regarding IT and findings during a visit to CNSF.

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IV. SUMMARY OF RECOGNIZED AREAS OF IMPROVEMENT FOR THE CNSF IT ORGANIZATION

Over the last ten years, there have been several acts put in place to assist government agencies with investing IT dollars wisely. Both the Government Performance and Results Act of 1993 (GPRA) and the Information Technology Management Reform Act of 1996, which was later renamed the Clinger-Cohen Act (CCA), intend to improve the long-term planning process, as well as the day-to-day operations of executive agencies (Banasiewicz, Jr., 2001).

GPRA was intended to improve federal business management, program effectiveness, and public confidence in government by making government offices develop measurable and attainable goals and performance measures that could be used to measure their progress. This law mandated the development of strategic plans and annual target goals including performance measures that would be used to measure progress toward attainment of these goals (Banasiewicz, Jr., 2001). The results are reported annually to Congress and are subject to independent audits. The CCA specifically tasks agencies to develop a process to improve their planning for IT projects to ensure that the government receives the best possible return for its IT investment.

In researching the legislation that has been passed in order to make government agencies (particularly the DoD) more efficient, we realize that CNSF has areas that need improvement. The guidance provided by the GPRA for overall strategy, and the CCA for efficient IT decision making, has laid out the blueprint for a federal agency to follow in an effort to better standardize processes across the board. Also, with guidance from upper-level decision makers, the DoD is in a transition period in which the goal is to better align itself with best practices used by successful businesses. In keeping with this idea, and leveraging the advantages of IT to assist in meeting its vision of manning, training, and equipping warships for tasking, CNSF must also take an enterprise approach. In the following sections, we will identify some of the areas that require improvement, and make general recommendations based on the legislation and literature that governs enterprise-level, strategic IT management.

A. FINDINGS AT CNSF

1. CNSF Organizational Strategy

In Chapter II, we acknowledged the importance of developing and executing an effective strategy to provide guidance to an organization over the long term (Johnson & Scholes, 2006). Developing this strategic plan is about first understanding where you are as an organization, where you are trying to go, and what resources are needed to not only get you to that desired end state, but to allow you to maintain a competitive edge. In the DoD, being primarily responsible for national security and the principle organ for carrying out military policy, this competitive edge is what keeps the United States one step ahead of its adversaries. Strategy for the DoD is a guide or course of action into the future—a path to get the armed forces from the "as-is" to the "to-be" model. The development of the strategic plan helps to clarify the DoD's priorities and ensures that key stakeholders and subordinate organizations have a firm grasp of what the objectives should be centered on.

While researching CNSF, it is quite evident that as an organization they know who they are and what is required to gain and maintain a competitive edge, which in this case is to man, train, and equip warships for tasking quicker, better, and more efficiently than the enemy. The mission statement of the command is clear, but the strategy to achieve the mission is deficient. CNSF is an echelon III TYCOM, whose primary mission is to ensure the continued high-level mission readiness of the SURFOR. CNSF has been very successful in completing its mission, but without internal guidance in a changing environment, their efforts appear to be ad hoc and not often understood throughout the organization. The alignment of CNSF strategy with the overarching SWE strategy has worked thus far, and makes good business sense, because CNSF is also the SWE Commander. However, this alignment does not provide the needed level of clarity as to what resources, decisions, investments, and policy should be undertaken to maximize the support of objectives outlined in the SWE strategy. CNSF, as with any organization operating within an enterprise, must have a well-defined organizational strategy that includes a long-term plan for the future (i.e., five years) along with short-term initiatives that fit into the construct of the SWE strategy.

CNSF would be able to complete its mission more effectively and efficiently if a plan of action were identified and well documented. As stated above, CNSF is very successful at completing its mission, but a roadmap to the desired end state is needed to strengthen CNSF's IT strategy. This roadmap could provide opportunities to reduce training and maintenance costs, enhance the quality of training, and deliver deployable assets ahead of schedule. With the focus of the overseas contingency operations shifting from Iraq to Afghanistan, the need for well-trained, deployable forces has increased. For the next few years, how does the CNSF staff and claimancy plan on dealing with the changing environment? In regard to technology, how does CNSF plan to leverage the benefits of such a rapidly advancing strategic enabler? How will CNSF adjust to the advancement in IT applications/infrastructure such as Consolidated Afloat Networks and Enterprise Services (CANES) and Next Generation Enterprise Network (NGEN)? Strategy without action provides no direction to an organization and, therefore, a firm, detailed strategy must be executed. Due to the structure of CNSF, an East Coast and West Coast TYCOM, it is vital that there is unity of effort and an overarching strategic plan that lays out the road ahead.

2. Lack of IT Strategy

As budgets are being cut across the DoD, it is now more important than ever for organizations to be more responsible in their spending and to become more efficient in cost-saving decision making. Over the last few years, the CNSF Comptroller has been advocating the need to reduce unnecessary costs within the HQ and for subordinate commands under CNSF authority. As a result, all areas of operation have been scrutinized for their spending and are forced to justify their need to continue funding certain programs and/or systems. In the area of IT, CNSF realized that there was a need to revisit the current IT strategy to ensure that the most cost-effective decisions were being made in regard to the development and investment in systems, applications, and infrastructure.

During the course of our research, we discovered that CNSF does not have an IT strategy. There was no documented plan with regard to the management of IT within the organization. The N6 Department was tasked with developing such a strategy, but to date

has not been able to produce one. Based on discussions with the CNSF N64, the primary guideline for their IT management was the National Security Personnel System, which is in no way tailored to the IT needs of CNSF.

Whereas an effective organizational strategy is concerned with achieving the mission, vision, and objectives of a company, an IT strategy is concerned with applications and its technical infrastructure (Chew & Gottschalk, 2009). CNSF utilizes several IT applications to include TORIS, CMP, and SURFOR Web. With no IT strategy to address the strategic implications of such applications, they become disparate, stove-piped programs that add minimal value, yet cost millions annually to manage. Without an IT strategy in place that discusses priorities and how future initiatives will augment SWE, DoN, and even DoD IT strategic objectives, it becomes a "dog-eat-dog" environment in which individual groups look for IT applications that only benefit one area and not the overall enterprise. If there is no strategy in place for IT, then investment decisions are founded on principles that may not be aligned with the goals and objectives of CNSF. An effective IT strategy should be brief, complete, and clearly connected to organizational success.

In order to employ IT to accomplish their organizational goals, CNSF must have an organizational strategy and IT strategy with which to align. It is not enough to just have an IT strategy, CNSF must also be committed to executing this strategy. Neither an organizational nor IT strategy will deliver the anticipated results, if the organization does not execute it as planned. Regardless of the benefits that IT could create, CNSF must be committed to change because IT will constantly need to be refreshed. A mediocre IT strategy, implemented with a deep and far-reaching organizational resolve, could end up being successful, whereas an exceptional strategy, implemented with apathy, may possibly fail (Boar, 2001).

3. Lack of Executive-Level CIO

One of the main stipulations of the CCA was to establish the CIO position within federal agencies. The term CIO is used in business to describe the senior person responsible for ensuring that an organization's IT infrastructure best supports its business needs (Stenzel, 2007). The CIO can be considered the governing body when it comes to

IT investment decisions, policy, and strategy. The CCA requires agency heads, acting through agency CIOs, to better link their IT planning and investment decisions to program missions and goals, and to implement and enforce IT management policies, procedures, standards, and guidelines (GAO, 2007). CIOs are responsible for a wide range of strategic and tactical IT activities identified in the CCA, such as developing architectures, as well as managing and measuring the performance of IT investment portfolios. Over the years, the position of CIO has evolved from a position exclusively focused on technical support, to a much more executive- and strategic-level position. The CIO should be a senior executive who is responsible for many of the items that factor into the success of IT such as the vision, long-range planning, policy development, and resource allocation. Below are some additional requirements outlined by the CCA (GAO II, 2000):

- Coordinates with the head of an organization and senior program managers to implement effective information management to achieve the organization's strategic goals.
- Assists the head of an organization in making sound IT investment decisions.
- Encourages IT improvements within an organization.
- Increases the value of an organization's information system resources by implementing integrated, organization-wide, technology architecture.
- Strengthens the knowledge, skills, and capabilities of IT within an organization.

Within CNSF, there is not an individual, at the executive level, designated to ensure that IT is managed properly. Perhaps this is because CNSF does not consider IT to be a core competency and, therefore, does not need executive-level oversight. We found that the CNSL N64 was indeed given the title of CIO and that, on both coasts, the N64 performed many of the functions and responsibilities of a CIO, but was not an executive-level manager. The N64 staff are, for all intents and purposes, technical experts, who provide technical oversight for CNSF and the claimancy. Unfortunately, the N64 has little decision-making power with regard to the strategic utilization of IT to support and improve efforts to meet the mission objectives of CNSF or SWE. The N64 at both CNSL and CNSP has a very difficult task of managing the day-to-day needs of

the HQ staff, shore facilities, and subordinate commands; however, they are limited in their scope with regard to policy, investment decision making, enterprise architecture, and aligning IT to business/mission objectives. In the business world, an organization's CIO should be able to plan organizational strategy along with executive peers, including the CEO, Chief Operations Officer (COO), and any other designated senior business executives (Chew & Gottschalk, 2009). For CNSF, the CIO should be a peer and on the same level as the Executive Director and the Force Comptroller (see Figure 4), and be positioned above the department heads (N codes) to promote leadership and authority throughout the CNSF organization.

a. IT Portfolio Management

The IT strategy that an organization follows can be classified by how the organization treats IT and what they expect from it (Rapp, 2002). As stated in Chapter II of this thesis, it takes a shared effort from both the business side as well as the technical side to address the needs of IT. The same can be said for the management of an organization's IT portfolio. IT portfolio management is defined as a method for governing IT investments across an organization, and managing them for value (Kaplan, 2005). Managing IT investments requires cross-organizational collaboration and decision making at the most senior levels. It requires systemic thinking that addresses and counters the root causes of unproductive IT expenditures, instead of simply bandaging the symptoms (Kaplan, 2005). IT portfolio management defines the decision-making process carefully so that innovation can be focused on results, and so that the decision-making process does not have to be reinvented each time an organization decides to invest in IT. Efficient portfolio management should strive to minimize wasting resources, so that IT applications do not receive funding until a sound plan is in place for the application to properly fit into the portfolio. Under the current alignment, CNSF is constrained on how it can manage its portfolio because of the tight restrictions that NMCI has placed on ashore Navy networks. The management of CNSF's IT portfolio appears to be ad hoc. The staff seems to manage informally via the chain of command. Based on the policies put in place by the DoD and the federal government, with respect to IT, there has to be a way to justify the Fleet requirement and its funding. For example, CMP and

TORIS are managed by their respective program managers, whereas the funding for these applications is included in the N6 Department's budget. The executive level is where the CIO has been mandated in every organization. Even with the addition of a CIO, CNSF is constrained by what applications they can include in their IT portfolio. NMCI manages the ashore network and, therefore, IT applications must be approved by them before use. As the Navy transitions from NMCI to NGEN, IT portfolio management will continue to be a problem, so in order for CNSF to properly manage its IT portfolio, upper-level management must be involved. For CNSF to continue to be successful at accomplishing its mission, they should have more oversight of IT applications once NGEN is fully operational.

b. N6 Oversight of All CNSF Funded IT

The CNSF N6 is in the best position to determine the funding priorities of all IT applications, but all applications do not belong to the N6 Department. The applications that were researched during this thesis, CMP and TORIS, are maintained by the N41 and N7, respectively. If the N6 is to be held accountable for the IT budget, then he should have portfolio oversight of applications such as CMP, SURFOR WEB, and TORIS. Since the CIO is more a managerially oriented executive, the N6 could be the technical manager that has oversight of all CNSF-funded IT. Ultimately, the IT investment decisions made by the CIO will be linked to CNSF's strategic objectives and mission, thus ensuring effective allocation of resources across the organization. Additionally, the decisionmaking should provide SWE-level management oversight to ensure that these programs are supporting the mission and goals set forth by the CNSF Commander and SWE Charter.

4. No Return on Investment (ROI) Metrics for IT

ROI is the ratio of money gained or lost on an investment relative to the money invested. ROI is a technique used to determine the value of the benefits realized from using IT, and whether it is going to exceed the cost of its development and implementation. Organizations need a standardized method for calculating ROI. An organization should be able to accurately compute the risk versus reward to arrive at an

investment selection decision. ROI presents a unique challenge for CNSF because unlike private corporations, the DoN does not use monetary profit to measure ROI, but uses mission accomplishment instead. When planning to implement a new IT system, it becomes very important to assess the ROI of that system in order to not waste money. In terms of the financial aspect of the applications examined during this thesis, CMP, SURFOR WEB, and TORIS demonstrate no accepted measure for a capital ROI. *The DoD Guide for Managing IT as an Investment and Measuring Performance* defines IT performance measure as:

> The assessment of effectiveness and efficiency of IT in support of the achievement of an organization's missions, goals, and quantitative objectives through the application of outcome-based, measurable, and quantifiable criteria, compared against an established baseline, to activities, operations, and processes (DoD, 1997, p. 3-1)

An organization is demonstrating effectiveness by carrying out the necessary tasks to meet goals and objectives, while accomplishing the mission. Efficiency implies that the best possible use of available resources was employed to deliver quality of work, reduce costs, or improve timeliness of a new IT system (DoD, 1997). To assist the managers at CNSF in maximizing the benefits of IT investments, the guide outlines six steps in effective performance measurement (DoD, 1997, p. 3-1):

- Define mission, key result areas, and business functions.
- Develop mission-related goals.
- Generate performance measures/indicators.
- Validate and verify performance measures.
- Implement the performance measures and collect data.
- Monitor and assess the results and repeat the process as needed.

B. SUMMARY

In this chapter, we identified some of the IT areas within CNSF that require improvement. If the role of IT is to automate core business processes, reduce operating costs, and ultimately to build and sustain a competitive advantage for a more effective way to employ IT. Before discussing IT, CNSF has to develop an organizational strategy

that is recognized by everyone within the organization. Since CNSF has increased the role of IT within its day-to-day operations, CNSF has to develop a well-defined IT strategy in order to use IT to its full potential.

Additionally, to make better use of IT, a governmental organization is required by the CCA to have an executive-level CIO. With representation at the executive level, there would be an individual capable of making IT-related decisions including the determination of when and when not to invest in particular IT applications and systems.

Finally, we looked at the N6 Department. The person designated as the N6 should have the ability to provide input for IT portfolio management as well as oversight for all CNSF IT-related funding. In Chapter V, we will look further into our findings and make general recommendations based on the legislature and literature that governs enterprise-level, strategic IT management.

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V. CONCLUSIONS AND RECOMMENDATIONS

A. SUMMARY OF RESEARCH

The direction and focus of this thesis was to examine the current IT strategy of CNSF and to research potential strategic approaches to managing IT. The research conducted in this thesis was the second phase of a three part project in the development of a cost effective IT strategy for CNSF. A portion of our data was based on a baseline assessment conducted by the preceding group, which covered the current budgeted IT programs; TORIS, CMP, and SURFOR WEB. Chapter II focused on defining strategic IT management and discusses three strategic approaches for IT management. Chapter III was centered on describing the organizational structure of CNSF breaking down responsibilities within the IT organization. Chapter IV identified areas that require improvement within the IT organization of CNSF in which if improved can foster a more effective IT strategy.

This chapter draws conclusions based on research and discussions with key stakeholders within CNSF financial and IT departments in addition to documented techniques and practices for successful strategic IT management. Recommendations are also provided in this chapter to assist CNSF executives and IT managers in understanding perceived areas for improved and to provide a foundation that will lead to the successful development of an IT strategy.

B. CONCLUSIONS

1. Research Question Findings

What are the strategic Information Technology goals for CNSF, and which strategic approach for managing IT will best support the vision, mission, and strategic objectives of CNSF?

Due to the absence of a command-wide IT strategy for CNSF, it is difficult to understand exactly what strategic goals have been established for the employment of IT to achieve mission objectives. What we do know and understand is that CNSF, as SWE

Commander, along with all other components of the Surface Enterprise, have an overarching objective of ensuring that "warships are ready for tasking". This objective is the main idea that is expressed in the SWE Strategic Plan; however mention of IT to achieve this objective is scarce within the document itself. The SWE Strategic Plan does take steps in the right direction as it discusses the need to improve Enterprise maturity across the SWE, the establishment of SWE infrastructure that allows process management with Enterprise interests in mind, and the installation of processes and tools that are required for an organization to operate as a mature Enterprise. Surely, one can see the implications using IT strategically to achieve these goals. If moving toward an Enterprise Architecture is truly the goal of the SWE, and this effort is to be led by CNSF, then there must be clear guidance provided on how to integrate IT with core business processes.

The DoN IM/IT Strategic Plan is the blueprint for all Navy and Marine Corps commands to follow for successful strategic IT management and complements the DoD IM/IT Strategic Plan. The DoN IM/IT is a clearly written document that can be understood and adhered to by all echelons of command. The DoN IM/IT identifies several goals that the SWE should adopt, and that CNSF must take the lead role on. These goals include the following:

- The Navy is in the process of right-sizing IT architecture by moving away from the practice of buying new servers and networks for each new application and instead, building a common computing infrastructure. Similarly, we are also moving away from vendor-centric applications to a Service Oriented Architecture so the warfighters can easily access the tools and data they need, regardless of location or operating platform.

- Commands at levels within the DoN, must be smarter about leveraging limited resources through effective IM/IT governance. A critical step is to ensure that commands efficiently manage application portfolios, requiring a clear strategic or financial return for each IM/IT investment.

- In the interest of effective management, the DoN is moving from decentralized to centralized management where it makes sense. The Command Information Officer serves an important role as the principal advisor to his or her Commander for issues regarding IM and alignment of IT investments to business priorities and assigned missions.

- Decision making should be architecture driven, balancing people, process, and technology as a basic function of how we do business.

> For our commands, this plan will help strengthen their alignment to DON IM/IT goals and help clarify resource priorities. For the IM/IT workforce, this plan provides understanding of the direction of IM/IT in the DON, and how their contributions support this broader vision (U.S. DoN CIO, 2008, p. 3).

The DoD has spent billions of dollars and created new agencies, (i.e., The Business Transformation Agency) in an effort to improve its business operations, and to move towards an enterprise architecture framework. The goal of this push has been to provide accountability to the American taxpayer by systematically improving DoD's core business processes, ERP systems, and IT investment governance. The DoD is moving away from the traditional military structure in which disparate branches maintain stove piped systems, policies, and processes and now views itself as an Enterprise, thus, encouraging enterprise thinking. CNSF, as the SWE led, must approach IT with this same strategy in mind. Using EA as a strategic approach to IT management has proven to be successful in the business world, yet DoD has not shared the same success. The main cause is that the different entities within do not all buy into the enterprise theory, do not provide strategic guidance to their subordinate commands as to how to get to from the "as-is" to the "to-be", and/or simply refuse to change even if it means saving dollars in the long run. CNSF must not fall into this trap and should approach every aspect of business operations, particularly IT, at the enterprise level. Collaborative, standardized, modular, and agile should be synonymous with the infrastructure, systems, and applications that CNSF invests in. Developing an IT strategy based on business transformation and enterprise architecture will allow CNSF to achieve its IT goals, support its overall mission, and properly align itself with the strategic IT objectives of DoD.

What are the strategic IT approaches available to CNSF's business level executives in order to better utilize and manage IT assets?

There are several strategic IT approaches that have historically worked well in both civilian and military organizations. In the past decade or so the DoD has pushed for the use of EA and ERP solutions that integrate and standardize core business processes across the Navy Enterprise. However, internal development of such solutions has been nonexistent, and has only lead to more outsourcing in which the DoD has significantly increased the need for additional funding.

Outsourcing does have its advantages that include being able to concentrate a greater effort on core business processes and long-term objectives while leaving the IT in the hands of the experts. However, the hidden costs including transition and management costs which increase over time are the biggest problem of IT outsourcing.

ERP systems consist of software applications that provide organizations with the capability to manage internal and external resources including tangible assets, financial resources, materials, and human resources. ERP can be very useful in the transformation and modernization of DoD business operations. However, ERP solutions may not be suited for smaller mission specific organizations.

EA is critical for building a foundation for execution because it maps out important processes, data, and technology enabling desired levels of integration and standardization (Ross et al., 2006). DoD has been focusing its efforts toward the development of an EA framework. Implementing an EA can be a complex and tedious task, and without having an architect that is experienced and understands the requirements of the organization, both money and time can be squandered away.

For CNSF, outsourcing is the easiest and perhaps the most applicable strategy for IT management. Going back to the mission of CNSF is to man, train, and equip warships ready for tasking and therefore IT is not a core competency of the organization, but definitely augments the achievement of the mission. CNSF could outsource some if not all of its IT services, but must have close oversight over the portfolio due to strict NMCI compliance requirements. In 2009, CNSF spent over $5M on funding for CMP, SURFOR WEB, and TORIS, and in the big picture this is a small dollar amount for

funding IT services. SURFOR WEB was outsourced under three contracts for development and continues to be maintained by contractors. Outsourcing IT could be very beneficial to CNSF, particularly since the merger has reduced the size of the CNSL staff.

If CNSF implements an ERP system, they would have to change the business processes at the same time in order to ensure a smoother transition. Based on research, we believe that at the SWE level an ERP solution is definitely feasible but at the CNSF HQ staff and claimancy it will be too costly and is not needed for mission success. The integration of current legacy systems such as CMP and possibly TORIS into the SURFOR Web will provide CNSF HQ with a robust, collaborative interface that may prove to be a lot cheaper than trying to outsource for an ERP solution. Again, the requirements must be met for this ERP to run on the NMCI network and would have to be flexible to the changing requirements that NGEN and the USFFC Fleet Forces Online (FFO) Portal will bring in the near future.

CNSF's IT strategy must have an enterprise approach. Every organization requires a different solution, so their IT strategies will be different as well. Our recommendation is for CNSF to execute an IT strategy that is aligned with and follows EA best practices and prescribed frameworks. By standardizing its business processes, CNSF would ensure that CNSL and CNSP have the ability to make those processes more efficient and, ideally, more effective. The ability for CNSF to integrate data between the two TYCOM staffs and support organizations should be seamless. Integration would allow CNSF to eliminate stove piped legacy systems by coordinating the delivery of business capabilities by end-to-end processes, and not individual functions. There is a lot of published material regarding EA and there are several frameworks that are well known. The Department of Defense Architecture Framework (DODAF), Federal Enterprise Architecture (FEA), and Business Enterprise Architecture (BEA) are all reference models for enterprise architecture, but it is up to the organization to decide which one is best for it.

The acquisition strategy would then build off of the IT strategy. Once CNSF devises the IT strategy the focus has to shift to a plan to acquire the IT systems. It would

develop a way-ahead plan that would analyze the current procurement process and recommend courses of action for improvement to CNSF's resource allocation.

What changes should be made to the CNSF organization to better align available resources with IT in order to accomplish its strategic IT goals?

CNSF as an organization is operating with extreme effectiveness in completing its mission of ensuring that warships are ready for tasking to support the war fighting requirements of the COCOMs as needed. However, in the area of efficient IT management there is room for improvement. Referring back to section B in Chapter II, we conclude that CNSF is at the first level of IT maturity, meaning that several IT packages have been linked to provide quasi-integrated IT support for most or all CNSF HQ Staff functions. CNSF understands the advantages of IT but lack the resources and manning to elevate it to the next level without a strategy in place to dictate initiatives, investments, and policy to guide the way forward. In the next section, recommendations have been identified that will provide a roadmap to the development of a strategy for IT management that meets the operational needs of CNSF.

C. RECOMMENDATIONS FOR CNSF

1. Hire an Executive Level CIO

In Chapter IV we learned that there has been a string of regulations enacted by Congress to improve the performance of the federal government in terms of IT and IT management. We also introduced the term CIO in Chapter IV. In order for a CIO to be effective, he or she should work in partnership with peers to ensure that the organization's strategies are translated into actionable plans that the IT team can execute. Currently at CNSF, a CIO at the executive does not exist. The N64 at both CNSL and CNSP do not have an enterprise outlook of the organization in regards to policy, investment decision making, enterprise architecture, and aligning IT to business/mission objectives. Without an executive level, CIO organizations could invest in IT systems that end up not being used to its full potential. Investing in IT that is not used to its fullest potential is irresponsible and suggests a breakdown in management within an organization. An organization usually does not make wise IT investments when the CIO

is not considered to be an essential participant in strategic discussions, and when the IT organization is not considered to be integral to the business strategy (CIO, 2003).

We recommend that CNSF appoint a civilian at the executive level. With a CIO at the executive level, he or she will be able to have a "seat at the table" and reasonable access to the Admiral and the rest of the executive team. With this proposed addition to CNSF's organizational chart, the leadership at CNSF will come to view the CIO as a management peer, and not just a person who is in charge of IT. The lack of an executive level CIO leaves the N6 department with little decision-making power with regards to the strategic employment of IT to assist in the efforts to meet the mission objectives of CNSF and the SWE. Figure 10 illustrates the CNSF Executive level Chain of Command with the addition of a CIO. Figure 11 shows a proposed CIO organizational chart.

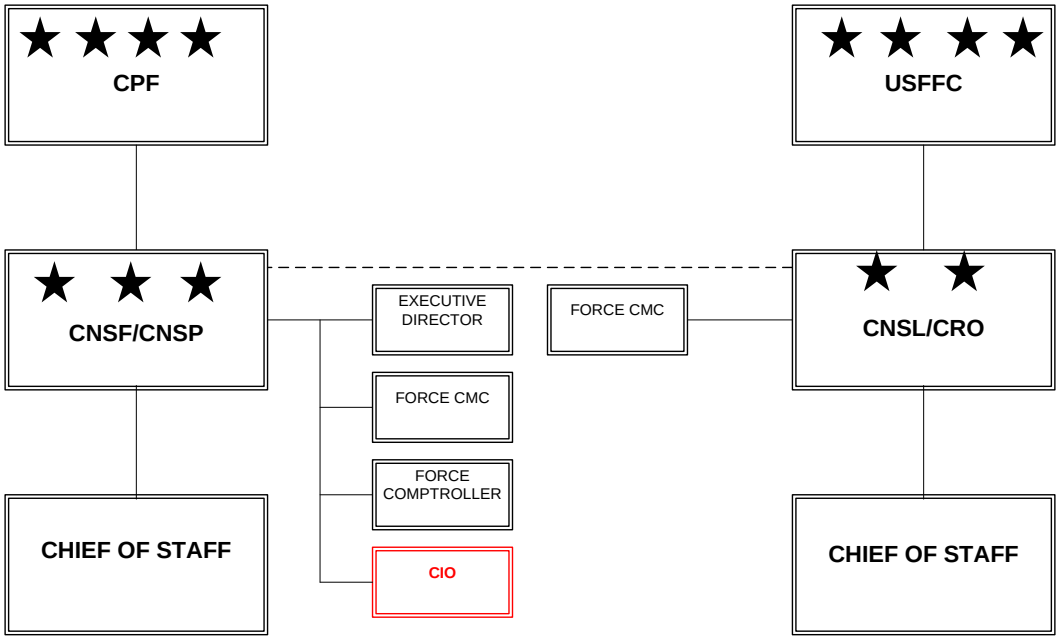

Figure 10. CNSF Executive level Chain of Command with the addition of a CIO

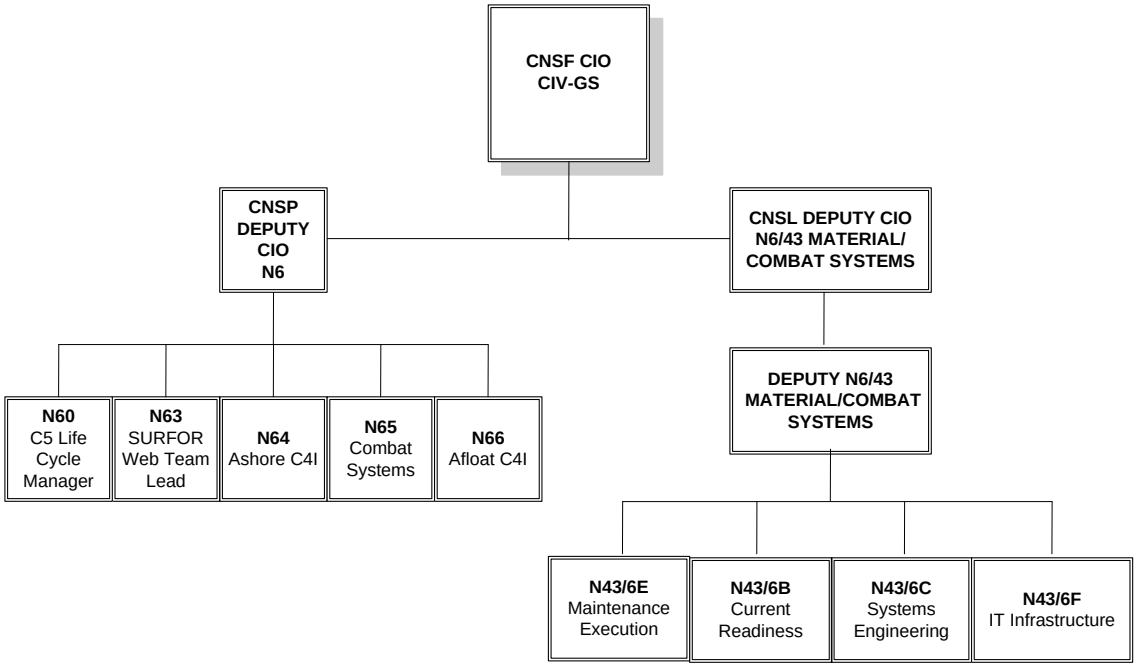

Figure 11. Proposed CNSF CIO Organization Chart

2. Conduct a Cost-benefit Analysis

When planning to implement a new IT application or system, cost becomes very important. Thus, it is critical for an organization to perform a cost-benefit analysis (CBA) of its IT in an analytical manner. The purpose is to compare the value of outcomes, costs, and ROI of the proposed application or system to help with the decision-making process. The goal of this CBA is to provide an agenda to assess advantages and disadvantages of instituting a new system within the organization. If an organization does not perform a CBA, the executive level decision-makers cannot make informed, well-planned, and carefully considered decisions.

CBA demands a high level of neutrality and a meticulous examination, so CNSF should bring in an outside entity to perform this analysis. This third party would be able to provide unbiased feedback which could result in improved IT decision-making. We find that the metrics that are currently in place at CNSF to effectively measure ROI are inadequate. The current budgeting process, for CNSF funded programs, requires that the various departments (N-Codes) provide written justification for continued funding, but these justifications are not based on cost-benefit. Having knowledge of the direction of

an organization is what strategy is all about, however, it is equally important to know what an organization is currently doing to execute its strategy. Provide cost-benefit metrics for the implementation of the proposed IT strategy. The implementation phase includes several associated plans, the most important being related to the acquisition of IT systems, applications, and infrastructure.

During the data collection phase of the CBA, it is critical to focus on both tangible and intangible benefits. It will be very challenging to translate intangible benefits into monetary figures, but just like ROI, CNSF could use mission accomplishment to assess benefits. Due to time and resource restrictions, the scope of our thesis research project did not cover activity-based costing, value added, or cost-based analysis to determine the best course of action for CNSF to move forward in the development of an IT strategy.

We think it is beneficial for CNSF to have a cost-benefit analysis conducted on all CNSF funded IT programs. For example, when SURFOR WEB was in the developmental stage, it started out with two sets of contractors. Over time, the SURFOR WEB technology has matured and now has become a robust knowledge management system. The cost for the SURFOR WEB contract has surpassed $2 million annually, so does the need for CNSF to continue to fund two sets of contractors still exist? The majority of the hardware for SURFOR WEB is located on the East Coast, whereas there are still a group of contractors on the West Coast who do not maintain this application. Our recommendation is to award one contract and reduce the two sets of contractors to one. During our research, there was a plan in place to attempt to consolidate SWE related contracts back in FY 2008. It is now FY 2010, and we are not sure if this two-year plan is or will be fully executed.

3. Future Research Opportunities

CNSF traditional decision making has led to disjointed programs that require separate contracts. This structure has fueled excessive service fees, and stove piped systems which results in CNSF exceeding its IT budget to maintain the systems. Future research will help identify the current traditional behaviors and introduce a more strategic

approach to decision making. An additional goal would be to evolve the current IT acquisition plan from its current state to one with a more strategic based concept.

Follow-on research should focus on a strategic framework for acquiring IT resources within CNSF. It will examine best practices and lessons learned from both public and private sector organizations as a means to develop acquisition recommendations to field an effective IT strategy. This research should result in an acquisition plan as a way-ahead plan for resource allocation at CNSF. Research directed toward the development of a strategic framework for acquiring IT resources within CNSF would greatly benefit the EA research efforts.

The development and successful implementation of an EA can be a complex task and should be done in phases. We recommend that CNSF use resources within its organization, in addition to research students to help execute the EA strategy. Follow-on student research should focus on the development of a comparative analysis of the various EA frameworks to include government frameworks such as the Federal Enterprise Architecture Framework (FEAF) and DODAF, along with commercial frameworks, such as The Open Group Architecture Framework (TOGAF) and the Zachman framework. This analysis will provide a baseline for CNSF to determine which framework fits their organization best.

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